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Vol. XI.

No. 1.

DEPARTMENT OF AGRICULTURE
AND
TECHNICAL INSTRUCTION FOR IRELAND.

JOURNAL.

Meeting of the Council of Agriculture—The Vice-President's Address
—The Position of Irish Agriculture—Technical Instruction in
Londonderry—Redwater in Cattle—Fowl Cholera—Epizootic
Abortion—Roadside Fruit Culture—Agricultural Motor Trials—
Bootmaking in Ireland—Egg Records—Early Potato Growing—
Crop Report—Fruit Crop Report—School Gardens in Ireland—
Winter Milk Production—Wintering Young Store Cattle—The
London Dairy Show — Official Documents — Notes and
Memoranda—Statistical Tables.

ELEVENTH YEAR,

No. 1.

OCTOBER, 1910.



DUBLIN:

PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
BY CAHILL & CO., LTD., 40 LOWER ORMOND QUAY.

And to be purchased, either directly or through any Bookseller, from
E. PONSONBY, LTD., 116, GRAFTON-STREET, DUBLIN; or
WYMAN AND SONS, LTD., FETTER-LANE, E.C.; or
OLIVER AND BOYD, TWEEDDALE-COURT, EDINBURGH.

PRICE 51 PENCE.

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NOTICE.

Communications respecting the literary contents of this JOURNAL should be addressed to the Superintendent of the Statistics and Intelligence Branch, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin.

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COUNCIL OF AGRICULTURE.

The eighteenth meeting of the Council of Agriculture was held on Wednesday, 19th October, 1910, in the Lecture Theatre of the Royal Dublin Society, Leinster House, Kildare Street, Dublin (by kind permission of the Council of the Society).

The Chair was taken at 11 o'clock by the Right Hon. T. W. Russell, Vice-President of the Department.

The following were present:—

Representing the Department:—The Vice-President; Mr. T. P. Gill, Secretary; Mr. J. R. Campbell, Assistant Secretary in respect of Agriculture; Mr. George Fletcher, Assistant Secretary in respect of Technical Instruction; Mr. R. Cantrell, *i.s.o.*, Chief Clerk; Mr. J. P. Walsh, Clerk in Charge of Accounts; Mr. J. D. Daly, Senior Staff Officer; Mr. T. Butler; Mr. J. V. Coyle; Mr. A. Kelly; Mr. John Hogan; Mr. H. G. Smith; Mr. R. H. Lee, and Mr. E. O'Neill.

MEMBERS OF COUNCIL ACCORDING TO PROVINCES.

LEINSTER.

Algernon T. F. Briscoe, *J.P.*; Captain Loftus A. Bryan, *J.P.*, *D.L.*; John Butler, *J.P.*; Thomas J. Byrne, *J.P.*; Thomas M. Carew; Denis J. Cogan; Thomas W. Delaney; James G. Dooley; Robert Downes, *J.P.*; Colonel Nugent T. Everard, *H.M.L.*; Peter Ffrench, *J.P.*, *M.P.*; William Field, *M.P.*; Rev. T. A. Finlay, *M.A.*; The Right Hon. Lord Frederick FitzGerald, *J.P.*; James Galvin; Patrick Hanlon; Michael J. Horan, *J.P.*; Walter M'M. Kavanagh, *J.P.*, *D.L.*; Patrick J. Kennedy, *J.P.*; James M'Carthy, *J.P.*; Joseph Mooney, *J.P.*; George F. Murphy, *J.P.*; Patrick J. O'Neill, *J.P.*; Charles H. Peacocke, *J.P.*; Henry Reynolds; William R. Ronaldson; James Ross, *J.P.*; Hugh Wallace.

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CONNACHT.

The Right Hon. Lord Clonbrock, K.P., H.M.L.; Rev Joseph G. Digges, M.A.; Rev. Charles Flynn, P.P.; John Galvin; Thomas G. Griffin; Rev. P. J. Manly, C.C.; Daniel Morrin; Rev. Philip J. Mulligan, P.P.

Mr. J. D. Daly acted as Secretary to the meeting.

The minutes of the seventeenth meeting, 24th May, 1910, a copy of which had been sent to each member of the Council, were taken as read, and were signed as correct.

The Vice-President delivered his Address.*

Lord Monteagle inquired whether an opportunity would be given to the Council to discuss the Department's proposal on the subject of co-operative credit referred to in the Vice-President's address.

The Vice-President said that the Department's proposals would first require the concurrence of the Agricultural Board, and that, if necessary, a special meeting of the Council would be called.

The Council proceeded to consider the heads of the proposed Bill, of which a copy of the preliminary draft had been sent on the 14th inst. to each member of the Council. The following is the draft submitted to the Council:—

PRELIMINARY DRAFT OF HEADS OF A BILL TO PROMOTE THE INTERESTS OF THE IRISH DAIRYING INDUSTRY.

The Dairying Industry (Ireland) Act, 1911.

An Act to promote the interests of the Irish Dairying industry by making provision for (1) the registration for certain purposes of creameries, and auxiliary creameries; (2) safeguarding the dairying industry against loss or injury from the use of false trade descriptions; (3) securing cleanliness in milk supplied to creameries, auxiliary creameries, and other premises where milk is received to be commingled with the milk of other suppliers for manufacture into articles of food for human consumption, and (4) securing cleanliness in butter sold as an article of food for human consumption.

* See pp. 16 et seq.

Be it enacted, etc., etc., as follows:—

Definitions.

1. The term "Creamery" shall mean premises adapted and utilised for the manufacture of butter in commercial quantities from the commingled milk supplies of a number of cow-keepers; such premises being registered as a creamery by the Department.

The manufacture of butter in commercial quantities shall mean that on every day on which milk or cream is treated at the premises the quantity so dealt with is sufficient to make at least 56 lbs. of butter; but the Department may in their discretion register as a creamery premises at which the quantity of milk or cream dealt with on any one or more days is insufficient to make 56 lbs. of butter.

2. The term "Auxiliary Creamery" shall mean any premises adapted and utilised for the separation of cream by centrifugal force from the commingled milk supplies of a number of cow-keepers, but not for the manufacture of butter; such premises being registered as an auxiliary creamery by the Department.

3. The term "Creamery Butter" as applied to Irish butter shall mean butter which has not been blended nor re-worked, and which has been made in a creamery from cream separated by centrifugal force from the commingled milk supplies of a number of cow-keepers.

Registration of Creameries and Auxiliary Creameries.

4. The Department shall, subject to the provisions of this Act, register all premises adapted and utilised for the purpose of a creamery or auxiliary in respect of which application for registration is duly made to them by the person *bona fide* carrying on the business, and no premises shall be described as a creamery or an auxiliary creamery save those premises which are registered as such by the Department.

5.—(1) Premises shall not be registered as a creamery or auxiliary creamery which are, or require to be, registered under the Sale of Food and Drugs Acts, 1875 to 1907.

(2) The cutting up and shaping of a quantity of butter into smaller lots for the purpose of sale or repacking shall not in itself constitute reworking nor necessitate the registration under the Sale of Food and Drugs Acts, 1875 to 1907, of any premises on which such process is carried on.

6. The registration of any premises under this Act shall *ipso facto* be cancelled in the event of the premises ceasing in any respect to come within the definition of a creamery or auxiliary creamery, or in the event of their being utilised for purposes which require their registration under the Sale of Food and Drugs Acts, 1875 to 1907.

Powers of Entry.

7.—(1) Any officer of the Department duly authorised in writing in that behalf by the Department shall have power to enter at all reasonable times any premises registered as a creamery or an auxiliary creamery, and any premises in respect of which application is duly made to the Department for regis-

tration, and any other premises where milk is received to be commingled with the milk of other suppliers for manufacture into articles of food for human consumption; and such officer shall have power to take such samples of any milk, cream, butter, or of any article capable of being used in the manufacture of butter, and to make such inspections as may be necessary for the purpose of enabling the Department to satisfy themselves that the provisions of this Act are complied with.

(2) Any officer of the Department shall on demand made by or on behalf of the owner of the premises produce his authority from the Department.

(3) Any owner who refuses, either by himself or his servant, to admit any duly authorised officer of the Department, or wilfully obstructs that officer in the execution of his duty, shall be guilty of an offence under this Act, but it shall be no offence if the officer of the Department has refused on demand to produce his written authority.

(4) The authority of an officer of the Department empowering him to inspect premises referred to under this Act shall be duly signed by the Secretary of the Department. The seal of the Department need not be attached thereto.

8. If the Department have reason to believe that on any premises other than those referred to in Section 7 (1) any provision of this Act is contravened, the Department may specially authorise any officer of the Department to enter the premises, and in such case the officer shall have the like powers of entry, inspection, and sampling as in the case of the premises referred to in Section 7 (1).

Application of the term "Creamery."

9. If any person carrying on the business of a manufacturer of, or a dealer in, butter or margarine, or margarine cheese, or milk-blended butter, uses the word "creamery" or any word or words resembling the word creamery in the description of any premises which are not registered by the Department as a creamery or an auxiliary creamery he shall be guilty of an offence under this Act.

10. If any person uses any fancy name, brand, or other description involving the use of the word "creamery," or "cream," or "creams," or any other word or words resembling the word "Creamery" to describe in invoices, circulars, advertisements, or on packages, wrappers, labels, or otherwise, any Irish butter other than creamery butter, or any butter consigned from a butter factory (as defined in Section 1 of the Butter and Margarine Act, 1907), he shall be guilty of an offence under this Act.

11. If any person sells or consigns creamery butter from a creamery or auxiliary creamery in any package or wrapper which is not marked in such manner as the Department may approve with the words "Irish Creamery Butter" and with a special registered mark or number to be allotted by the Department, he shall be guilty of an offence under this Act.

12. If any person sells or consigns Foreign or Colonial butter or butter not made in an Irish creamery, from a creamery or auxiliary creamery in any package or wrapper which is not marked in such manner as the Department may approve with

such words as may be necessary to indicate that the butter is not of Irish manufacture or is not Irish creamery butter as the case may be, he shall be guilty of an offence under this Act.

Trade description of Cheese.

13. Any person carrying on the business of a manufacturer of cheese who sells or consigns cheese made from separated milk or skim milk, or from a mixture of whole milk and separated or skim milk, or from milk from which any portion of the fat has been abstracted, shall be guilty of an offence under this Act, unless the cheese is marked in such manner as the Department may approve with such words as may be necessary to indicate that the cheese has been made from milk from which the fat or portion thereof has been abstracted.

Provided that this Section shall apply only to classes of cheese which, according to the custom of the trade, are made from whole milk.

Cleanliness in milk supplied to Creameries, Auxiliary Creameries, and other premises where milk is received to be commingled with the milk of other suppliers for manufacture into articles of food for human consumption.

14. Any person shall be guilty of an offence under this Act who delivers or tenders for use in a creamery, auxiliary creamery, or other premises where milk is received to be commingled with the milk of other suppliers for manufacture into articles of food for human consumption:—

(a) milk so unclean as to indicate culpable negligence in its handling or treatment; or tainted milk; or milk which curdles on boiling;

(b) milk contained in dirty vessels;

and any person refusing to furnish any officer duly authorised by the Department under Section 7 or 8, with the name and address of the person supplying such milk shall be guilty of an offence under this Act.

Cleanliness in butter sold as an article of food for human consumption.

15. Any manufacturer of butter who sells as an article of food for human consumption, butter so unclean as to indicate culpable negligence in its preparation, and the purchaser of such butter direct from the manufacturer, shall be guilty of an offence under this Act; and any person refusing to furnish any officer duly authorised by the Department under Section 7 or 8, with the name and address of the manufacturer or purchaser, as the case may be, shall be guilty of an offence under this Act.

Penalties.

16. Any person guilty of an offence under this Act shall be liable on conviction under the Summary Jurisdiction Acts for a first offence to a fine not exceeding £5 and not less than £1; and for a second offence to a fine not exceeding £10 and not less than £5; and for a third or any subsequent offence to a

fine not exceeding £20 and not less than £10, or to imprisonment for a term not exceeding six months.

17.—(1) The Department shall be empowered to institute proceedings for breaches of any provisions of this Act and for the recovery of penalties under this Act.

(2) All penalties recovered under this Act shall, notwithstanding any provision in any other Act, be paid to the Department and shall be applied by them in aid of the expenses incurred by them in the execution of this Act.

18. This Act may be cited as the Dairying Industry (Ireland) Act, 1911, and shall apply to Ireland only.

The suggestion was made by Captain Loftus A. Bryan, D.L., that the consideration of the Bill should be deferred, on the ground that the draft had not been issued in sufficient time to permit of its adequate consideration at the present meeting. It was most desirable that members should have an opportunity of consulting those directly interested in the industry.

After some discussion, Mr. Harold A. M. Barbour moved that the consideration of the proposed Bill be postponed for six months.

A question arose as to whether this motion was in order, but the Vice-President decided to accept the motion, which, however, not being formally seconded, was withdrawn before being put to the vote.

The question was then put as to whether there should be a general discussion on the Bill or whether the Bill should be discussed section by section.

It was agreed that the Bill should be discussed section by section.

DRAFT FOR "THE DAIRYING INDUSTRY (IRELAND) ACT, 1911."

Section 1. *Agreed to.*

„ 2. *Agreed to.*

„ 3. Amendment proposed in line 1 of this section to insert the word "Irish" before the word "creamery." (*Mr. Thos. J. Byrne*).

Question, that the word "Irish" be there inserted. Put and *agreed to.*

Section as amended *agreed to.*

(In the course of the discussion on this section Mr. Montgomery suggested that provision should be made in the definition so as to permit a cow-keeper to supply cream instead of milk.

Mr. Montgomery's suggestion was noted for consideration by the Department.

A question was asked as to whether the re-working in winter at creameries of small quantities of creamery butter purchased would not be permissible under the definition.

The Assistant Secretary in respect of Agriculture pointed out that during the course of the Inquiry conducted by the Departmental Committee on the Irish Butter Industry, of which he was Chairman, it was made clear by trade witnesses that the custom of the trade is that any butter that is re-worked is considered not to be creamery butter. He was of opinion that it would not be justifiable to eliminate the word "re-worked" from the definition, and that by doing so creameries would be deprived of the protection which it was intended to give them under the Bill.)

Section 4. *Agreed to.*

(A question was asked as to whether under this section creameries could be refused registration on the plea that the machinery used was not up to the Department's requirements. The Assistant Secretary in respect of Agriculture said that he was aware of no genuine existing creamery, as that term is at present generally understood, which would be excluded from registration on the ground of unsuitable equipment.)

Section 5 (1). *Agreed to.*

„ 5 (2). Amendment proposed in line 1 of this sub-section to insert the words "creamery butter or of" after the word "of" and before the word "a" in that line. (*Rev. Mr. Digges*).

Question, that those words be there inserted. Put and *agreed to.*

Section as amended *agreed to.*

Section 6. Amendment proposed in line 2 of this section after the words "auxiliary creamery" to insert the words "as defined in this Act." (*Mr. Trench*).

Question, that those words be there inserted. Put and *agreed to.*

Section as amended *agreed to.*

Section 7 (1). *Agreed to.*

„ 7 (2). *Agreed to.*

„ 7 (3). *Agreed to.*

„ 7 (4). *Agreed to.*

„ 8. *Agreed to.*

„ 9. *Agreed to.*

„ 10. *Agreed to.*

„ 11. Amendment proposed in line 1 of this section after the word "consigns" to insert the words "for sale." (*Rev. Mr. Campbell*).

Question, that these words be there added. Put and *agreed to.*

Section as amended *agreed to.*

Section 12. Amendment proposed in line 3 of this section to leave out the words "which is not marked in such manner as the Department may approve with such words as may be necessary to indicate that the butter is not of Irish manufacture or is not

Irish creamery butter," and to substitute therefor the words "has not the country or place of origin of contents distinctly stated on package." (*Rev. Mr. Digges*).

Amendment by leave *withdrawn*.

Another amendment proposed that for this section a section be substituted prohibiting the sale or consigning of foreign or colonial butter from registered premises within the meaning of the Act. (*Mr. Butler*).

Motion made that this amendment be *agreed to*.

A division was taken:—For, 11; Against, 55; Majority against, 44.
Section 13. *Agreed to*.

„ 14. Amendment proposed in line 7 of this section to leave out all the words from the word "or" to the word "boiling." (*Rev. Mr. Campbell*).

Question, that the words proposed to be deleted be left out.
Put and *agreed to*.

Section as amended *agreed to*.

Section 15. *Agreed to*.

„ 16. *Agreed to*.

(Mr. Montgomery suggested for consideration that the provision of a minimum fine of £1 for a first offence should not be applicable in the case of farmers convicted under Sections 14 and 15.

The Vice-President promised that the Department would give this suggestion their consideration.

Another suggestion was made by Mr. Downes, viz., that firms convicted of offences under this Act should be legally obliged to display a notice to that effect.

The Vice-President said that this suggestion would receive consideration, but he thought that a similar proposal made in connection with the Licensing Acts was not assented to by Parliament.)

Section 17 (1). *Agreed to*.

„ 17 (2). *Agreed to*.

„ 18. *Agreed to*.

New clause.—The expenses of administration of this Act shall be paid by monies voted by Parliament. (*Vice-President*).

Agreed to.

Question, that the Draft Bill as amended be passed. Put and *agreed to*.

The following resolution was proposed by Mr. William Field, M.P., and seconded by Mr. D. J. Cogan (Co. Wicklow):—

"That this Council approves of the Majority Report of the Vice-Regal Commission on Irish Railways, and urges the Government to take immediate measures to have the recommendations of their Commission carried into effect."

After considerable discussion the resolution was put to the meeting. A vote was taken with the following result:—

For	31
Against	34

Majority against 3

The voting was as follows:—

For—*Leinster*—Algernon T. F. Briscoe, J.P.; Captain Loftus A. Bryan, J.P., D.L.; John Butler, J.P.; Denis J. Cogan; Robert Downes, J.P.; Peter Ffrench, J.P., M.P.; William Field, M.P.; James Galvin; Michael J. Horan, J.P.; Patrick J. O'Neill, J.P.; Charles H. Peacocke, J.P. *Ulster*—Joseph Davison; John Keenan, J.P.; Right Rev. Monsignor M'Glynn, P.P., V.G.; Rev. Lorcán O Ciarain, P.P. *Munster*—James Byrne, J.P.; Captain Wm. C. Coghlan, J.P.; Thomas Corcoran, J.P.; Thomas Duggan; Most Rev. Dr. Kelly, Bishop of Ross; William M'Donald, J.P.; Michael Mescal, J.P.; Michael J. Nolan, J.P.; Cornelius O'Callaghan, J.P.; David L. O'Gorman; Timothy Sheehy; Michael Slattery. *Connacht*—Rev. Charles Flynn, P.P.; John Galvin; Rev. P. J. Manly, C.C.; Rev. Philip J. Mulligan, P.P.—31.

Against—*Leinster*—Thomas J. Byrne, J.P.; Thomas M. Carew; Thomas W. Delany; James G. Dooley; Colonel Nugent T. Everard, H.M.L.; Rev. T. A. Finlay, M.A.; the Right Hon. Lord Frederick FitzGerald, J.P.; Walter M'M. Kavanagh, J.P., D.L.; Joseph Mooney, J.P.; George F. Murphy, J.P.; Henry Reynolds; William R. Ronaldson; James Ross, J.P. *Ulster*—William Bailie; Frank Barbour; Harold A. M. Barbour, M.A.; Hugh T. Barrie, J.P., M.P.; Rev. E. F. Campbell, M.A.; Alex. L. Clark, J.P.; Robert T. Huston, M.R.C.V.S.; John S. F. M'Cance, J.P.; Thomas A. M'Clure, J.P.; H. de F. Montgomery, J.P., D.L.; Captain John Patrick, J.P.; John Porter Porter, J.P., D.L.; Colonel R. G. Sharman-Crawford, J.P., D.L.; Michael Sheils, J.P.; Captain T. Butler Stoney, J.P., D.L. *Munster*—Edmond Cummins, J.P.; Right Hon. Lord Monteagle, K.P., D.L.; Edmond Nugent, J.P.; Hugh P. Ryan. *Connacht*—Rev. Joseph G. Digges, M.A.; Thomas G. Griffin.—34.

The following did not vote—*Leinster*—James M'Carthy, J.P., and Hugh Wallace—2.

The following resolution standing on the agenda paper in the name of Mr. William Field, M.P., was, by leave, withdrawn:—

“That this Council approves of the establishment of the Association for the Nationalisation of Irish Railways and Canals.”

The following resolution proposed by Mr. William Field, M.P., and seconded by Mr. William M'Donald, J.P. (Co. Cork), was passed unanimously :—

“ That this Council regrets to see from the official announcement regarding the recent meeting in London of the Development Commission that it is proposed to postpone the consideration of the case for Irish forestry until a scheme for afforestation for England and Scotland is ready. We desire to point out that the question of Irish forestry has been considered and reported on and a scheme prepared by a special Departmental Committee; and that, in view of the operation of the Land Acts, it is a matter of extreme urgency that action should be taken on the recommendations of that Committee without further delay. Furthermore, there is no comparison between the situation in Great Britain as regards forestry and that of Ireland, and, therefore, there is no reason why the case of Ireland should be postponed. The Council therefore urges the Department to take every action open to them to see that this matter is dealt with at once.”

The following resolution proposed by Mr. R. T. Huston, M.R.C.V.S. (Co. Armagh), and seconded by Rev. E. F. Campbell, M.A., was passed unanimously :—

“ That the Council notes with satisfaction that the Department have taken action on the resolution of the Council demanding the establishment of a Research Station for the study of agricultural problems, by seeking funds from the Development Commissioners for the purpose. We desire to emphasize our opinion that to be of value to the country such research station must concern itself with practical problems directly affecting the development of Irish agriculture in its various branches.”

The following resolution was proposed by Mr. Michael Mescal, J.P. (Co. Clare), and seconded by Mr. Timothy Sheehy (Co. Cork):—

“ That, in view of the Development Grant being now available, and portion of said grant being for the purpose of acquiring woods and forest lands in Ireland, the Department be requested to give effect to the Vice-President's statement at the meeting of the Council held on the 24th of May last to the effect that the first portion of the grant available for such purposes would be utilised in purchasing the forest and wood lands of Captain Vandeleur, Kilrush, County Clare.”

The Vice-President said that the Department were at present engaged in negotiations with the Estates Commissioners in regard to the purchase of the woods on the estate referred to.

Whereupon Mr. Mescal asked leave to withdraw his resolution, and the resolution was, accordingly, by leave, withdrawn.

Mr. George F. Murphy, J.P. (Co. Meath), enquired as what steps were taken to put into operation Part I. of the Weeds and Agricultural Seeds (Ireland) Act, 1909.

At the request of the Vice-President the Assistant Secretary in respect of agriculture stated that the County Councils of the following counties had already signified their consent to the making by the Department of Orders under Section I. of the Act:—Antrim, Armagh, Down, Dublin, Fermanagh, Kerry, Kildare, Kilkenny, Limerick, Londonderry, Meath, Monaghan, Queen's, Roscommon, Tipperary (S.R.), and Westmeath. Eighteen officers were temporarily employed by the Department on the work of inspection in these counties, and as a result of reports received from them 2,169 notices were served on occupiers requiring the destruction of noxious weeds. In 94 per cent. of these cases the requirements of the notices had been complied with.

The Vice-President stated that the Department had thought it better, when commencing to enforce the provisions of this Act, to proceed by persuasion rather than by the institution of prosecutions. Later on it might, of course, be deemed desirable to have recourse to legal proceedings.

It was suggested (Mr. Joseph Mooney, J.P.) that Councils of counties and county boroughs which had not as yet adopted the provisions of the Act should be urged to do so as soon as possible.

It was further suggested (Mr. Thomas A. M'Clure, J.P.) that posters calling attention to the requirements of the Act should be displayed throughout the country.

These suggestions were noted.

The following resolution was proposed by the Rev. P. J. Manly, c.c. (Co. Leitrim), and seconded by Mr. William Field, M.P.:—

“That the time has arrived when, in the opinion of this Council, the spraying of the potato crop at least twice a year should be made compulsory by Act of Parliament.”

After some discussion the Vice-President suggested that it would be better to allow the present system of voluntary spraying to continue for some time longer.

Whereupon the Rev. P. J. Manly asked leave to withdraw his resolution, and the resolution was, accordingly, by leave, withdrawn.

It was suggested (Lord Monteagle) that the Department should collect and publish statistics showing the extent to which potato spraying was being adopted throughout the country. This suggestion was noted.

The following resolution proposed by Mr. William Field, M.P., and seconded by Mr. John Porter Porter, J.P., D.L. (Co. Fermanagh), was passed unanimously:—

“That the Council are glad to observe that the Development Commissioners announce that a case has been made out for the application of further funds for the improvement of horsebreeding in Ireland. In this connection they desire to reiterate their belief that no scheme for improvement in horsebreeding

can be really effective until the legislation already demanded by the Council for the suppression of unsound and unsuitable sires is obtained."

The following resolution proposed by Mr. William Field, M.P., and seconded by Rev. Charles Flynn, P.P. (Co. Leitrim) was passed unanimously:—

"That this Council calls upon the Government to initiate and carry out a general scheme of arterial drainage, as, owing to the main river arteries being choked, an enormous area of arable land is annually flooded and waterlogged and the crops destroyed. The health of the inhabitants in those districts is endangered and the climatic conditions become abnormally rainy. Besides the moving bog disasters are the result of the absence of a general drainage system and facilities."

The following resolution was proposed by Mr. Michael Sheils, J.P. (Co. Down):—

"That this Council do consider the advisability of recommending the Government to grant bonuses to unmarried agricultural labourers with a view to make this class take an interest in continuing their services and working more in the interest of their employers."

After some discussion it was suggested that the consideration of the general question raised by the resolution should be postponed.

Mr. Sheils accepted the suggestion, and the resolution was accordingly, by leave, withdrawn.

Mr. Peter Ffrench, J.P., M.P., called attention to the want of accommodation for the fishermen's boats at Fethard and Kilmore, and to the necessity of removing old wrecks in Wexford Bay.

At the request of the Vice-President, the Chief Inspector of Fisheries stated that the work of dredging Kilmore Harbour was proceeding. As regards Fethard the Department were prepared to co-operate with the Wexford County Council in carrying out a small scheme for the improvement of the harbour, but it seemed advisable to await the result of the application which the Department had made to the Development Commissioners for funds necessary to the carrying out of a satisfactory scheme rather than expend money now on a smaller scheme which might be eventually useless.

The Vice-President said that if the funds for which the Department had applied were obtained it might be found possible to consider the larger scheme required for improving Fethard Harbour.

The following resolution was proposed by Mr. William M'Donald, J.P. (Co. Cork), and seconded by Mr. David L. O'Gorman (Co. Cork):—

“That it be made a condition that all stallions registered under the Department's scheme for encouraging improvement in the breeds of horses in the County of Cork shall be exhibited, not necessarily for competition, at any one of the subsidised shows in the County.”

At the request of the Vice-President, the Assistant Secretary in respect of Agriculture said that the suggestion could not be carried into effect during the coming season as communications had already been addressed to the stallion owners. The Department would consider whether, in subsequent years, it should not be left optional with County Committees to adopt a regulation of the kind proposed.

After some discussion Mr. M'Donald asked leave to withdraw his resolution. The resolution was accordingly, by leave, withdrawn.

Mr. D. J. Cogan (Co. Wicklow) called attention to the heavy losses sustained annually by sheep-breeders and flockmasters in the County Wicklow and elsewhere in Ireland by the disease known as Braxy or Redwater in sheep, and to the reports of Professor Mason relative to the experiments already carried out, and moved :—

“That the Department is hereby requested to have these experiments continued, with a view to ascertaining the most successful preventive of this disease; and to take the necessary steps to secure the provision of a sufficient supply of such material for all those owners who are desirous of testing its efficacy.”

The resolution was seconded by Mr. Patrick Haulon (Co. Carlow), and passed unanimously.

The Council adjourned at 5.35 p.m.

THE VICE-PRESIDENT'S ADDRESS TO THE COUNCIL OF AGRICULTURE.

MY LORDS AND GENTLEMEN,—Having distributed a Draft Bill and Circular in regard to a question upon which the Department desires your counsel and advice, and the discussion of which may take some time, I am glad to say it will not be necessary for me to detain you at any great length in my introductory observations to-day. There are, of course, a few Departmental matters which cannot altogether be passed over in silence, but nothing that I have to say will entail any very large demand upon your time or attention.

THE BUTTER INDUSTRY.

The first subject calling for observation is the position of the Butter Industry. It will be within your recollection that some eighteen months ago I appointed a Departmental Committee to inquire into, and report upon, the conditions under which the Butter Industry was carried on, and how these could be amended and improved. The Committee, of which Mr. Campbell was Chairman, presented its Report, with the minutes of evidence, a few months ago. That Report has naturally attracted much attention. The Butter Industry is a great factor in Irish trade, and it was right and proper that the proceedings of such a Committee should be carefully watched, and that criticism should follow its findings.

DRAFT DAIRYING INDUSTRY BILL.

In the Draft Bill, which has been circulated to the members of the Council, will be found, in effect, the view of the Department upon the main questions involved in whatever controversy has arisen in this connection. The recommendations of the Report have in substance secured the approval and support of the Irish Butter Trade Association, of the Cork Butter Market Trustees, and of the Irish Creamery Managers' Association. They have also been favourably considered by various agencies connected with the Butter Industry in Great Britain. There are, however, in Ireland something like 700 Creameries, co-operative and proprietary, and from a certain number of these Societies a discordant note has come. Of these 700 Creameries 70, and 16 or 17 Conferences of Creamery proprietors, have, so far as can be made out, passed more or less hostile resolutions. These resolutions have been based upon a completely erroneous view of what the Committee proposed. Many of these protesting Creameries appear to have believed that the

Department desired to control the Butter Industry in all its operations, from the milking of the cow to the actual sale of the butter. It will not be possible for this misconception to live after to-day's proceedings. No such thing was ever contemplated. The Department has responsibilities enough without voluntarily assuming others. On the other hand, a certain number of Creameries believing that legislation was called for, and not crediting the baseless story as to the Department's intentions, have supported the recommendations of the Report. And by far the greater number of the total of 700 by their silence have at least tacitly acquiesced in the findings of the Committee. The discussion upon the Draft Bill will be taken immediately after my address, and I trust that it may be possible for the Council to come to a fairly unanimous conclusion upon its various provisions. My hope is that, when it comes to be dealt with by Parliament, the Bill, as far as possible, may be taken as an agreed measure.

DECLINE IN EXPORTS OF IRISH BUTTER.

The Department is all the more concerned about this matter because the industry is one which, both as regards quantity and value, has shown a distinct, and somewhat serious, decline in recent years. The exports have come steadily down since 1906, the figures for the past four years standing thus:—

	Quantity. cwts. †	Value. £
1906	844,027	4,283,487
1907	818,004	4,009,072
1908	751,942	4,026,028
1909	719,625	3,625,111

This constitutes a fall of £658,326 in four years. The various branches of the industry may have reasons to account for these disquieting figures, but we have only to read the evidence taken by the Departmental Committee to understand at least some of the causes for this steady decline. The absence of official registration and inspection has engendered in the minds of wholesale merchants a want of confidence in our butter, in consequence of which it does not command the price its high quality oftentimes deserves. This point was amply brought out in the evidence given before the Committee, and it constitutes a chief argument for the necessity of this Bill. Another chief cause of the decrease is the all-but entire absence of winter dairying, necessitating, in many cases, the re-making of the market every year. I trust that we shall get to the discussion of the matter to-day on its merits, and without the intrusion of questions that are of trivial importance, even when taken at their face value.

AGRICULTURAL CREDIT.

Upon the subject of Agricultural Credit, also, there has been some discussion since our last meeting. I need not go into the details of what has taken place. It will be sufficient for me to-day to say that, on reviewing the whole facts of the case, after having sought information in many quarters, and having minutely examined the condition of those Credit Societies which hold loans from the Department, numbering 100 at the present time, I have been confirmed in the belief that a sound system of Agricultural Credit cannot only be of great service to the small farmers of Ireland, but that, in the new circumstances of certain portions of the country, it may rank as one of the necessities of agricultural development. This opinion I expressed before the House of Lords Committee when giving evidence on Lord Shaftesbury's Bill last Session. A point of supreme importance, however, is that any credit system of this kind should not only be specially applicable to the part of the problem which is most urgent under the present stage of the Land Question, but should be based upon strict business principles. Without this latter safeguard what is designed to be a blessing may be turned into a curse. And it is clear to my mind that the Department, when called upon to facilitate credit for this purpose, must exercise adequate and direct control over any scheme in which its funds are thus involved.

DEPARTMENT'S LOANS TO CREDIT BANKS.

Having gone carefully into the condition of those banks which have obtained loans from the Department since 1900, I find that the total amount advanced to 170 Credit Societies has been £17,911, and that loans are now outstanding in 100 cases, the amount of indebtedness being £9,126 11s. 2d. The second set of figures to which I desire to direct the attention of the Council are these. The number of Credit Societies from which loans have been *entirely* recovered is 70, and the amount so recovered £6,367. Of these 70 Societies 17 cases were referred to the Chief Crown Solicitor for legal proceedings; in 26 cases the loans were repaid through pressure from the Department; and 27 Societies repaid their loans voluntarily or in the ordinary course. The phrase "pressure" means that the Department recalled the loan on the receipt of unfavourable reports of the working of the bank. From these figures it will be seen that proceedings, either legal or Departmental, had to be taken in regard to 43 of these 70 Societies. A third set of figures shows that in the case of 33 Societies where the Department has partially recovered its loan, the amount so recovered is £2,417 8s. 10d. Legal action was necessary in 7 of these cases, and pressure from the Department in 13; the remaining 13 Societies

making the repayments voluntarily or in the ordinary course. It is in the case of this class of bank that any possible loss is most likely to arise. Of the 67 remaining banks which have obtained loans from the Department but have not yet repaid them in part or in whole, I am not in a position to say much. In some of these cases, at least, it has already been found necessary to put pressure on the banks for repayment; but the majority of them may be taken as either "satisfactory" or "fair" in their working. Taking these figures, then, as a whole, they indicate that out of the total number (170) of Agricultural Banks which obtained loans, 68, or over one-third, have either been called upon through the Chief Crown Solicitor, or been pressed by the Department to repay loans made under certain conditions and for a definite period. I am not quoting these facts in any spirit hostile to Agricultural Credit. Quite the contrary. I am quoting them to indicate where reform and improvement are needed. It is perfectly idle to talk of a system producing such results as being in a satisfactory state; and it is utter folly to say that an attempt to put such a system on a business footing constitutes hostility to Agricultural Credit. The attempt has got to be made anyhow, and Agricultural Credit will be a great deal the better for the operation.

NECESSITY FOR LARGER LOANS TO NEW OCCUPYING OWNERS.

But there is a more important and, as it seems to me, a not less urgent consideration to be taken into account. These little Credit Societies, very useful in their way when rightly worked—and I propose an improved system of management and working—these little Societies do not grapple with the real crux of the question of Agricultural Credit as it is presented to us at the moment by the Land Acts, and especially in the Western districts. That crux, so far as these districts are concerned, is how to provide the occupiers of new holdings or of purchased holdings, whether they be colonies of migrants who have been removed from uneconomic holdings or others, with the capital necessary to enable them to properly stock and work the land. The Department has to do a great deal for these holders when they are turned over to its care. They have to be instructed, guided and helped in various ways; but most of the instruction will be in vain if they are unable to obtain capital to give effect to the lessons they are taught. If they are not able to stock the land and to equip their steadings, what will be the result? The State will simply be transforming a set of large graziers into a set of small graziers, and the last stage of the ranches will be worse than the first. Now the operations of the existing Credit Societies are not designed to meet this problem. The average capital lent by the Department to such Societies is from £50 to

£100, and the average number of members in the banks is about 50. The transactions are mostly in sums of £4 to £15. But what is wanted in the special case of migrants and others to which I have referred are loans ranging for individual holders from about £50 up to about £100.

EXPERIMENT IN COUNTY ROSCOMMON.

We have experimented with one loan of this size. I will mention the case with which I am personally familiar. Down in Roscommon there were a group of occupiers who had been granted new holdings by the Estates Commissioners and the Congested Districts Board. With the holdings striped and fenced and a little in hand towards putting up buildings, these men stood practically bare of money to stock or work these holdings. I went down and saw them myself. They were a fine lot of men—just the type of men the land wants, and the type that is pouring out of the country by every American liner. As things stood, however, no matter how well-intentioned they might be, these peasant proprietors had no alternative before them but to sub-let a great part of their new holdings for grazing under the eleven months' system. The Department intervened at this point, had the group formed into a Credit Society, and lent them £1,000. That I say was an experiment, and it was a hopeful experiment, for the capital thus advanced put an end to the paralysis, and is, I hope, going to prove the saving of the situation. Now for this branch of the problem, which I repeat is urgent—for these new holdings and colonies are being created under the Land Acts every day—it is obvious that transactions on a larger scale than those involved in the Credit Societies we have hitherto been dealing with are called for. A correspondingly larger financial arrangement may be required on the part of the Department, whether directly through its funds or indirectly through its credit. The first thing that seems to me to be required, however, is at once to effect some improvement in the existing banks or Credit Societies which are making use of the Department's funds. The Council will understand, of course, that I am not speaking of any Societies other than those using the Department's funds. The second course is to make some extension of Agricultural Credit to meet the case of migrants and others which I have just described. In both these directions some advance must be made, and you will see that what I am about to propose is neither violent nor out of the way, but is a natural and necessary development.

NEEDED IMPROVEMENT IN EXISTING CREDIT SYSTEM.

First, let me mention possible improvements in the existing system. We have carefully considered suggestions that have been

made, and they have been many. One of these is to follow the Continental plan and organise a Central Credit Society or Bank. That course has probably much to be said for it. But it is a very advanced development and might require legislation; and in any case I do not think it need even be considered at this stage. Moreover, I do not wish to prejudice the future of this system one way or the other by dealing with such developments. What is needed beyond all doubt at the present time, and what must be secured, is the question of improved management for the existing banks. This is a point beyond all controversy. The banks to which the Department's money is lent cannot be allowed, so long as they are debtors to the Department, to remain in the unsatisfactory state of business methods which I have demonstrated as existing. These banks at the present time need, above all things, effective management, effective supervision and inspection, and a sure and certain system of audit. I propose to secure these reforms for banks which may now be debtors to the Department, or for such others as may be formed under, or may desire to come in under, the Department's scheme. In this connection I will mention one point that has impressed me. The present system of Credit Banks apparently works well enough where the proper human material to undertake the work of management and supervision is available. Where this is wanting the system infallibly breaks down. And I do not think that effective management will ever be possible in the great majority of cases without some small payment being made for the discharge of the secretarial and clerical work involved. This view is supported by important Continental opinion. Special care will also require to be taken in order to ensure that the work of inspection and audit is effective and carried out in a thoroughly practical and business-like spirit.

EXTENSION OF CREDIT SYSTEM TO MEET LARGER REQUIREMENTS OF MIGRANTS AND OTHERS.

As to the second step in the extension of the system of Agricultural Credit, you will remember that the Agricultural Board, in a Minute which they passed in 1908 on the general subject of co-operative organisation, announced their view that the Department should be prepared to promote directly certain forms of co-operative effort. So far as Credit Societies are concerned, I propose that we should, where desirable, proceed to act in accordance with that Minute. You will not expect me—and this is not the occasion—to go into this matter more in detail to-day. The action which it may be advisable for the Department to take in advancing in this direction I propose to discuss in consultation with the Agricultural Board, whose concurrence will, of course, be necessary in whatever

arrangements may be suggested; and I hope to be in a position to announce a positive policy at an early date.

These are some of the steps which I propose to take, and, as I have said, it will be seen that they are neither revolutionary nor violent in their character.

THE INCREASE IN TILLAGE IN IRELAND.

There is one matter of especial interest and importance to the country which I am sure the Council would not wish me to pass by without some comment. It will be remembered that on the occasion of our last meeting I directed special attention in my address to the continuous decrease in tillage, and the corresponding decline in the population. I said then that the two had gone hand in hand since the great Famine. I was able to point out, however, that at long last there was some evidence of a check to emigration and to the decline in tillage. It was a matter upon which I necessarily spoke with caution, but I was in a position even then to say that there were signs of a revival in tillage in many parts of the country, notably in the South; and though, if the County totals were taken, the number of those in which there had been a net increase was small, yet there were some such, and in most Counties there were one or more districts to be found where tillage was apparently gaining ground. The figures were not at the time in a state in which they could be used publicly. It is somewhat different now, and I am able to announce to-day—indeed, I summarised the information a few weeks ago when I met the deputation of Welsh farmers at our Agricultural College at Glasnevin—that all over Ireland this increase in tillage has assumed substantial proportions. The increase is not confined to one Province, nor to a single crop. Leinster stands for a net increase of 24,266 acres; Munster for 6,668; Ulster for 17,140; and Connaught for 18,981—or a total increase of 67,055 acres. The largest increase is in corn, but green crops, flax and fruit all share in the revival.

A MORE HOPEFUL OUTLOOK.

This is certainly a gratifying statement for me to be able to make. I should like to say here, by way of parenthesis, that so accustomed has the public mind become to a continuous decrease in tillage, there has been an attempt to discredit these figures by the assertion that a new method of enumeration has been followed. There is not a particle of truth in this assertion as the method of enumeration is identical with that followed heretofore. What makes the increase more interesting and suggestive is that during the year 1909 the population did not go down. There were 1,000 more people in Ireland in 1909 than in 1908. What is equally interesting

is that the cattle exports, as might have been expected, showed a slight falling off in the same period. I do not seek now to probe the matter further. It is enough that the long and miserable record of the past has been broken, and that the tide has seemingly turned. The new policy of the Estates Commissioners and of the Congested Districts Board may have contributed to produce the change. I think this is extremely probable. But it must be borne in mind that much of the land which has gone so far to make up the new holdings created under this policy is still left in grass; and although the increase, taking the area into account, is most marked in Connaught, yet Leinster and Ulster have an extremely creditable record. Let us hope that the process of converting the land may go forward. Should it do so, Winter Dairying and other much-needed reforms will have a chance.

THE DEVELOPMENT COMMISSION AND THE DEPARTMENT'S CLAIMS.

It will be remembered—I have indeed referred to it on more than one occasion—that the Government, under the Finance Act of last year, made provision for the appointment of a Commission to which was entrusted an annual sum of not less than £500,000 for the development of agriculture, etc., in the United Kingdom. Attaching great importance to this proposal, the Department lost no time in preparing a scheme for submission to the Commissioners. It was decided that, in the application to be made, no increase of funds for the general work of the Department should be asked for, but that a strong claim should be put forward on behalf of certain classes of work outside the ordinary County and Departmental schemes. Inasmuch as a certain amount of publicity has already been given to the claim made by the Department, I think it right that the main lines of the case put forward should be laid before the Council, and thus secure accuracy in public comment—a rather important thing in these days!

CLAIM FOR AFFORESTATION PURPOSES.

The Department has long held that the work of afforestation was urgent. The Departmental Committee on Irish Forestry not only established this fact, but outlined a scheme upon which the work might proceed at once. The first item in our claim upon the Development Commissioners was, therefore, for a sum of £100,000 for this purpose. The statutory existence of the Commission is limited to five years—which will doubtless be extended—and our claim was spread over that period.

CLAIM FOR HORSE-BREEDING PURPOSES.

The question of Horse-breeding has also occupied a good deal of attention of late, and is one of supreme importance for this country, and for Great Britain as well. Ireland supplies 70 per cent. of the horses required for army purposes; and of the remaining 30 per cent. a large proportion are Irish-bred horses. The Horse-breeding Schemes in connection with the Department have, like everything else, been subject to criticism; but they have stood the test of examination, and I observe, not without satisfaction, that the new Scheme of Horse-breeding for Great Britain is largely founded upon that which has been in operation for 10 years in Ireland. We have, therefore, not to begin afresh. We have simply to extend the work. Our claim under this head for the five years was for £50,000.

CLAIM FOR AGRICULTURAL SCIENTIFIC RESEARCH WORK.

Another subject which has been discussed by the Council repeatedly is that of Scientific Research applied to agricultural problems. Mr. Huston, one of the representatives of Armagh on the Council, has, I think, brought the matter forward at nearly every meeting over which I have presided. The ravages of disease amongst all kinds of live stock, and the appearance of what may almost be called new maladies of a serious and puzzling character, have combined to make research work an absolute necessity. What is true of animals in this connection is also true of plants; and if our work is to go forward and great loss to the agricultural community is to be prevented, a Research Station is one of those things that cannot be longer delayed. For this purpose we have made a claim for £75,000.

CLAIM FOR AID TO IRISH FISHERIES.

The last item in our statement of claim was on account of Irish fisheries. This subject is also one familiar to the Council. The Department is allowed an annual sum of £10,000 for the development of Irish fisheries. The cost of policing the coast by means of the steam cruiser "Helga," comes to close upon £6,000. The remainder is what stands for fishery development. Of course the case has only to be stated to see how impossible it is for the Department to do much of the work that is absolutely necessary. An application has, therefore, been lodged for £50,000 under this head.

PRESENT POSITION IN REGARD TO DEPARTMENT'S CLAIMS.

The total claim made by the Department thus amounts to £275,000 for the period of five years. The announcement that our

case for Horse-breeding has been admitted and a grant recommended by the Commission has officially been made, and the evidence for the other grants has been tendered by the Department and the witnesses examined. But at this stage I am not in a position to state what the result of the deliberations of the Commissioners in regard to the other subjects has been. Any announcement of the kind would be manifestly inadvisable, and to use language that has now become almost classical, we must "wait and see." I may, and I think I ought to, say, however, that the proposal to postpone the Forestry question until the British schemes are ready for consideration, would constitute a serious injury to Ireland. The Royal Commission which inquired into the questions of Coast Erosion and Afforestation for England and Scotland has not, so far as I know, concluded. And a policy is being carried out in Ireland which does not apply to either England or Scotland. Large quantities of timber are being cut down in Ireland virtually by Act of Parliament. The Land Purchase Acts, beneficent as they are, must be held responsible for this distinct and serious injury. In addition to this difficulty, land suitable for planting is constantly passing under the Land Acts. When it has passed into the hands of the tenant purchasers the difficulty of securing it will be greater than it would be at the present time. A policy so fruitful of mischief ought soon to be brought to an end, and I trust that the delay which has been announced will not be of a prolonged character. While our work is thus impeded, every day carries with it an injustice to this country.

THE CROPS AND THE SEASONS.

The last few months have constituted a period of great anxiety to the Department and to all interested in agriculture. The year 1909, viewed from the standpoint both of agriculture and of general trade, was perhaps the most prosperous year in an economic sense that Ireland has ever known; and at the beginning of the present year hopes were entertained that with a good season we might even better what had gone before. I regret to say that these hopes have to a considerable extent been marred. The wet and stormy weather experienced in the month of August, which, in some respects, is the most critical month of the year for agriculture, resulted in great damage being done to all kinds of crops in certain parts of the country. In low-lying ground, and especially in the neighbourhood of the Shannon and other rivers, hay and corn crops suffered severely. Fortunately the weather in September, verging as it did upon that of an Indian summer, did much to repair some of the damage. In regard to the potato crop, the estimates officially received by the Department from all over the country—they are

but estimates and cannot be turned into actual figures until the potatoes are out of the ground—would go to show that in the Western districts the loss on this crop will be very considerable. Over the larger part of the country, however,—and there are exceptions even in the West—the crop has done better; and, as I have said, the long spell of fine weather in September did much to save the situation. Potato digging is now in full operation all over the country, and reports are being daily received. The Department will consequently very shortly be able to arrive at something approaching an accurate conclusion on the matter.

IRISH FISHERIES—MOTOR BOATS.

The Fisheries Branch continues to pursue the policy adopted for the past few years, of gradually developing the use by our fishermen of boats driven by paraffin motor engines. Since the year 1908 eight such vessels have been built and engined. They are of a size that will enable the crews to take part in all kinds of fishing. Orders have also been placed for three more, and for one steam fishing boat. The value of this fleet, including fishing gear, amounts to something like £11,500, over £10,000 of which has been advanced by way of loan. The honesty of our fishermen is proverbial, as is evidenced by the manner in which they have repaid the loans made to them out of the Sea and Coast Fisheries Fund, in regard to which I have to say that the bad debts on about £52,000 advanced do not exceed 15s. per £100. Outside the transactions in connection with motor boats which I have referred to, money has been advanced for the installation of engines in large boats heretofore propelled by sail alone, and also for the conversion of smaller craft into motor-driven vessels; and we have provided the instruction which necessarily arose from this condition of affairs. We have also helped in getting the vessels insured. Six of the larger boats took part in the recent herring fishing from Howth and were very successful, some of them making nearly £600.

Endeavours are being made to increase the sale of fresh fish in Irish towns. This is a matter attended with the greatest difficulty, but fair success has attended the efforts which have been made, and it is proposed to continue these efforts. The Council will be glad to hear that illegal trawling has materially decreased of late.

In view of the importance of some of the subjects on the agenda, I refrain from reference to other items of Departmental interest and importance, merely noting that the scheme of

VETERINARY DISPENSARIES FOR THE CONGESTED DISTRICTS

is now in actual operation over a considerable area of the country. Since the beginning of September, 181 Dispensaries have been

established under the care of 26 Veterinary Surgeons. The scheme is one that is largely used and much appreciated by the people, and as the initial difficulties are being rapidly surmounted, a very short period will suffice to bring all the districts within its ambit. I have also to announce that the arrangements for establishing the

AGRICULTURAL SCHOOL FOR NORTH-EAST ULSTER

are now almost nearing completion. A very suitable farm with the necessary buildings has been purchased near the town of Antrim, and the Department and the County Committee may be counted on to get to work without unnecessary delay.

INQUIRY INTO THE FLAX INDUSTRY.

Finally, it will be of public interest for me to say that the concluding meetings of the Departmental Committee on the Flax Industry will be held during the present month—so that the Report may be expected before the close of the year.

THE POSITION OF IRISH AGRICULTURE.

ADDRESS BY THE VICE-PRESIDENT.

On the 19th September the Right Hon. T. W. Russell, P.C., Vice-President of the Department of Agriculture and Technical Instruction for Ireland, entertained to luncheon at the Albert Agricultural College, Glasnevin, a party of farmers from Glamorganshire, who are studying Irish agricultural methods.

After luncheon the VICE-PRESIDENT, addressing the visitors, said that his first duty was to tender them on behalf of the Department a most cordial and hearty welcome there that day. A few weeks ago they had the pleasure of welcoming a group of farmers from Essex on the same mission. They were glad to see them there, and took it somewhat as a compliment that they thought it worth while to come over from the land of the predominant partner to see what they were doing and how they were doing it. He had to apologise for the absence of two of his colleagues, Mr. Gill, the Secretary, and Mr. Campbell. They were both in London, due at the first meeting of the Development Commissioners the next day, a rather interesting meeting, because there was a good deal of money to be divided, and they were there to see Ireland got its fair share! He thought when everything was concluded that Ireland might come first! The visitors had come at a time of great interest and not a little anxiety. They had been anxious for some time in regard to the state of the crops, not only in the West of Ireland, but elsewhere. That was a subject upon which one occupying his position must speak with great reserve and caution. Those who had been most troubled had felt most relief by the spell of three weeks' fine weather which they had enjoyed. It was impossible to repair much of the damage that had been done, but the three weeks of good weather had enabled things to be done without which the country would have been left in a lamentable condition. In a week or two when the potatoes were dug they would be better able to see what the real damage was. When a party like that came over it was important to remember that they were looking at the work of three State Departments. In the last twenty-five or thirty years Ireland had gone through what was in every sense an agrarian revolution. Something like 800,000 men who used to till the soil for others now owned it. The land was rapidly changing hands, and landlordism had almost ceased to exist, for those who tilled the soil were now owners. But much more had to be done yet. There was a great deal of land still held under the old system of tenure. It was a curious fact that the part of Ireland which really wanted most

help by this transfer of the land was precisely the part which had benefited least by it. There were reasons for this, but, being a member of the Congested Districts Board, he could say that they were within measurable distance of the Land Acts working in the West. Large numbers of landlords had consented to sell, and before long the Land Acts would be working vigorously in the West, and the people there would come in for some of the advantages already reaped by others. The Congested Districts Board, which was formed by Mr. Arthur Balfour when Chief Secretary, was one of the best pieces of work and statesmanship done for this country. The Department of Agriculture was really a great educational institution. It was stated to be possessed of what people called ample funds, but he denied that! Whether the funds were ample or not depended upon the work which had to be done. The Boards of Agriculture in England and Scotland had only themselves to blame for any lack of funds, because instead of devoting the money to agricultural education, they frittered it away on all subjects—in some parts of Scotland for the relief of the rates. Ireland did not get more than its share of the "whiskey money," but they conserved it, and were using it well to-day. When they gave aid to any county in Ireland the county contributed a rate in addition. They helped those who were willing to help themselves, and every county now struck a rate in the pound. They heard a good deal in these days of a bureaucracy. They had a good many critics in Ireland of various kinds. In other parts of the Kingdom they were cursed with critics—"those good people who sit still in armchairs and damn the general world for standing up." In Ireland no one sat in an armchair. Everyone was an expert in every mortal thing that could be thought of. What he should like to be understood was this—that the Department had no claim to be anything but a popular institution. In the first place, every agricultural scheme that was in existence was not the work of the Department alone. Every scheme that they submitted had to be considered and confirmed by the Agricultural Committee of the county, and that Agricultural Committee was a popularly-elected body. When the scheme was adopted the Department gave money, and it was carried out by the County Committee, and not by the Department. The Agricultural Council of the Department consisted of 108 members, two-thirds of whom were popularly elected and one-third nominated by the Department. There was another body, the Agricultural Board, whose functions were extremely important. They had no initiative, it might be, under the Act of Parliament, but that was a mere figment, because they had the power of the purse, and no money could be spent without their concurrence, and if people told him that such a body had not the power of initiative, it might be true in form, but not in substance. The Vice-President dealt

further with the schemes of the Department, and the educational work of its Colleges, and said that the result of the work of the Department was above ground, and to-day he was able to make an announcement that no one in any official position in Ireland had been able to make for many a long year. One of the saddest things in Ireland, continued Mr. Russell, has been that ever since the Famine the population has been diminishing, and tillage has been going down. The land has been going out of cultivation. The people have been leaving the country. Well, for the first time for many years it is possible to state that the tide has seemingly turned. I am, perhaps, a little in advance, because I believe in these matters Reports ought to be presented to Parliament before any use is made of them, but, with Parliament not sitting, I run the risk of breaking the unwritten law and tell you to-day what will be glad news throughout Ireland, that for the first time for many years tillage has increased in Ireland, by something like 70,000 acres; and it is not that it has increased in one place or in regard to one crop—it has increased in every one of the four provinces, and the increase applies to most crops. I can only hope that even our worst critics will be inclined to say that the Department has not altogether lived in vain. That is glad news, apart altogether from the Department and apart altogether from agriculture. I am not going to claim that this is due to the Department or anyone else. The fact is enough for me. If the increase in tillage had been confined to one province I should have said that the new holdings which the Congested Districts Board had been creating accounted for it, but it applies to all the four provinces and to various kinds of crops. And besides it must be remembered that a considerable area of these new holdings is left in grass. People who wish well to Ireland have seen with dismay year after year the land going out of cultivation and bullocks taking the place of men, and the announcement I make to-day with regard to the increase in tillage is one of the most gratifying things I could have to announce to you. Continuing, the speaker said that he wished the farmers of Ireland would look at agriculture as a profession for their sons. They had more clerks than they knew what to do with. If the farmers only chose to do it, they could get their sons educated practically free as agriculturists, and a trained agriculturist on Irish land in the future was in for a very good thing indeed. Let the farmers send the best of their boys to the Agricultural Colleges, and they would do a great deal to change the face of Ireland within a reasonable time.

Alderman DAVID, Cardiff, having returned thanks for the hospitality extended to the party, referred to the work of the Department of Agriculture, and said they had no conception of the extent of the work that was being done. They had taken the greatest interest in

what the Department was doing for the Irish people. There was no doubt the Department was leading the way, so far as the United Kingdom was concerned. Not only that, but the remainder of the United Kingdom was hopelessly behind! As a matter of fact, they, as representing the farmers of Glamorganshire, did not know whether to go round in absolute despair after seeing what had been done in Ireland as compared with what they were doing in Wales. They must aim at having an Agricultural Department for Wales, and that Department would be a Department like the Irish Department. The Principality of Wales would have to go upon the lines that the Irish people had gone upon.

Alderman David, having referred to the remarkable improvements apparent in the live stock of this country, dwelt upon the work that is being done for young women in the Munster Institute, and said how much they were all impressed, too, with the results of the Congested Districts Board operations in the district of Castlereagh.

MR. LLOYD, Glamorganshire, also referred with satisfaction to the improvement made in the quality of Irish live stock through the influence of the Department's schemes.

MR. BLOSS, Co.C., Glamorgan, said he visited Co. Kerry forty years ago, and found it then in a very bad state. He visited it again five years ago, and found an extraordinary improvement. He was also astounded to see the improved conditions in Galway and Mayo as a result of the work of the Congested Districts Board.

MR. EVANS, Radyr, Cardiff, having also associated himself with the thanks expressed to Mr Russell and the Department

The VICE-PRESIDENT expressed the pleasure he felt at hearing them refer to the improvements that had taken place in the Castlereagh district. The work in those districts was very great, and what they, as Welshmen, had got to bear in mind, was that the work had all to be done on account of the blunders of fifty years ago. Curses, like chickens, had come home to roost, and those who had thought that everything was settled when they had driven the people out of Connaught, had now found that they had to put the people back there again. It was costing a good deal of money and effort, but, with God's help, it would be done.

Concluding, Mr. Russell said if the Welsh people did not get a Department now they were not the people he took them to be. They had the absolute control of the Exchequer, and nobody could say nay to them!

TECHNICAL INSTRUCTION IN IRELAND.

[* * *The following is the eighth of a short series of articles which has been appearing in the JOURNAL on some recently established Technical Schools in Ireland. These descriptive articles relate to centres differing widely in population and needs, and it is believed that they will be of interest and value in view of future developments in towns in which permanent buildings have not yet been provided. Three of the articles dealt with buildings already erected, but adapted to meet the needs of Technical Schools in Ballymena, Queenstown and Newry. (1) Four of the articles dealt with the Belfast Technical Institute, the Technical School, Ballymoney; the Central Technical Institute, Waterford, and the Municipal Technical Schools, Dundalk; (2) these buildings were new. The article below relates in like manner to a new building—the Technical School in Londonderry.*]

TECHNICAL INSTRUCTION IN LONDONDERRY.

By G. E. ARMSTRONG, M.Sc.

Principal, Municipal Technical School, Londonderry.

PART I.—INTRODUCTORY AND HISTORICAL.

At the time of the passing of the Agriculture and Technical Instruction (Ireland) Act, 1899, there existed in Londonderry a School of Art, organised by a Committee interested in the progress of Art work. The income was derived from Subscriptions, Fees, Science and Art Grants, together with a grant of £100 per annum from the Corporation. The classes were held in the old Guildhall situated in the Diamond (the rent being the nominal sum of £1 per annum), and were attended by students in such numbers as to tax the accommodation of the building. In addition to School of Art work, classes in Machine Drawing, Practical Geometry, Building Construction, Electricity, and Pure Mathematics were held, and worked in connection with the examinations of the Science and Art Department, South Kensington. On the passing of the Act, the question of levying a penny rate for Technical Instruction was discussed by the members of the Corporation, and they decided

(1) See issue of the Department's Journal for January, 1908, Vol. VIII. No. 2, page 260; April, 1908, Vol. VIII., No. 3, page 465; and October, 1908, Vol. IX., No. 1, page 76.

(2) See issue of Department's Journal for April, 1907, Vol. VII., No. 3, page 457; for July, 1907, Vol. VII., No. 4, page 652; for October, 1907, Vol. VIII., No. 1, page 11; and for July, 1908, Vol. VIII., No. 4, page 606.

MUNICIPAL TECHNICAL SCHOOL, LONDONDERRY.

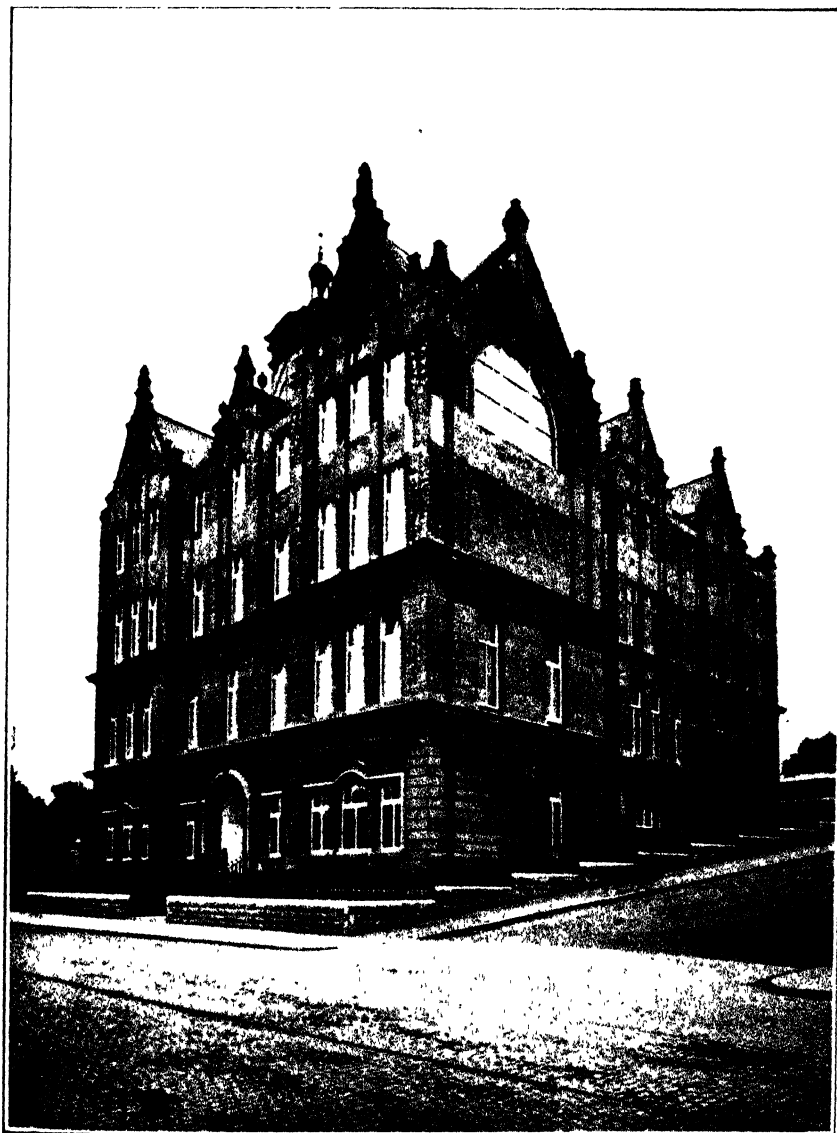


Fig. 1.—Elevation.

unanimously in its favour. The Corporation in July, 1900, afterwards nominated a Committee composed of members of the Corporation and private citizens, and the school and its equipment, together with the staff, were taken over by the new Committee. Great care was exercised in choosing the members of the Committee to have, as far as possible, all the trades of the city represented, and this was duly accomplished. The members of the Committee elected as their Chairman, Sir William M'Learn, J.P., who was Chairman of the School of Art Committee, and who has been for many years (and is at the present time) one of the mainstays of education in the city.

One of the first questions to be taken up by the Committee was the drafting of a scheme of work suitable to the needs of the city. Information relative to the numbers of apprentices engaged in the various industries was obtained, and the local conditions considered; and these points influenced largely the nature of the instruction to be provided. After discussing the matter with the officials of the Department, they decided that the premises in use were utterly unsuited to carry out a scheme of Technical Instruction according to modern methods. Before proceeding further, however, it was decided, on the recommendation of the Department, to send a deputation to visit a few of the centres of Technical Instruction in England. This was done, and the deputation, influenced by the magnitude and development of Technical Instruction at the centres visited, reported strongly on the advisability of proceeding as soon as possible with the erection of a new building suitable to the needs of the locality.

The Committee at once proceeded to look out for a plot of land suitable for the purpose required, and, after considerable delay, were successful in acquiring one on Strand Road, admirably suited for the purpose they had in view.

After going into the question of cost, it was estimated that a sum of £12,000 would be required to erect such a building as they had in mind, and steps were taken to negotiate a loan of this amount. Many difficulties were encountered in connection with the matter, but these being gradually overcome, the loan was sanctioned at the end of the year 1905.

In the meantime, the Committee, with a view of developing the Science and Technological sides of the School, decided to appoint a Headmaster, with experience in the organization of Technical Schools, and, at the same time, an expert in Engineering subjects. The appointment of the Headmaster was made in March, 1902, and he entered upon his duties in the following September. Several new classes were started, and the work organized on practical lines, but it was at once realised that owing to the lack of accommodation in the

building for the work, very little development could be expected. A room was rented in the Diamond, and used for Cookery, and Commercial subjects; while at the same time the Committee room at the Guildhall was requisitioned for a class in Tailors' Cutting; and a Physical Laboratory with temporary fittings was arranged in the School.

The object of the Committee was to create a good nucleus of students who would be ready for immediate development at such time as the new school might be ready for occupation, and their efforts were steadily applied in this direction.

After the loan was sanctioned, the Architect for the new building was appointed, the plans were prepared and approved by the Department, and the contract given.

The foundation stone was laid in October, 1906, by His Excellency the Lord Lieutenant of Ireland, and the school opened for the admission of students in September, 1908.

PART II.—DESCRIPTION OF THE BUILDING.

Before drawing out the sketch plans, the Committee took thorough cognisance of the industrial and educational needs of the locality, and the lines along which development would probably proceed. After due consideration, it was decided that the building should be on utilitarian lines, and that the amount available would be better expended on the inside rather than the outside.

The building (Fig. 1) is of the central corridor type, the entrance being from Strand Road. A series of steps lead up to the vestibule, the entrance being provided with a vestibule screen, fitted with folding doors, mounted on reversible hinges. The framework of the screen is made of teak, and the upper panels are of thick, bevel plate-glass. The floor of the entrance hall is of mosaic set in squares, each square having a coloured border; the basis of the design being the oak and acorn which are symbolic of Derry, or "The City of the Oaks."

The walls and ceiling of the hall are handsomely panelled and moulded in "Parian Cement." Leading from the entrance hall are the Office, Committee Room, Principal's Room, Men's Cloak Room, the main staircase of the building, and the central corridor. The entrance to the corridor is by a pair of pitch-pine folding doors, mounted on reversible hinges; the floor of the corridor is of smooth cement, and the walls have a cement dado four feet high. To the right of the corridor are the Carpentry and Joinery and Engineering Workshops; and to the left the Steam and Electrical Laboratory, Smithy and Boiler House, Plumbers' Workshop, Store Room, and Men's Lavatory (Fig. 2). The height of all rooms in the building is 16 feet, the windows are ample in size and number, and give abundance of light in all the rooms. At the end of the corridor

MUNICIPAL TECHNICAL SCHOOL, LONDONDERRY.

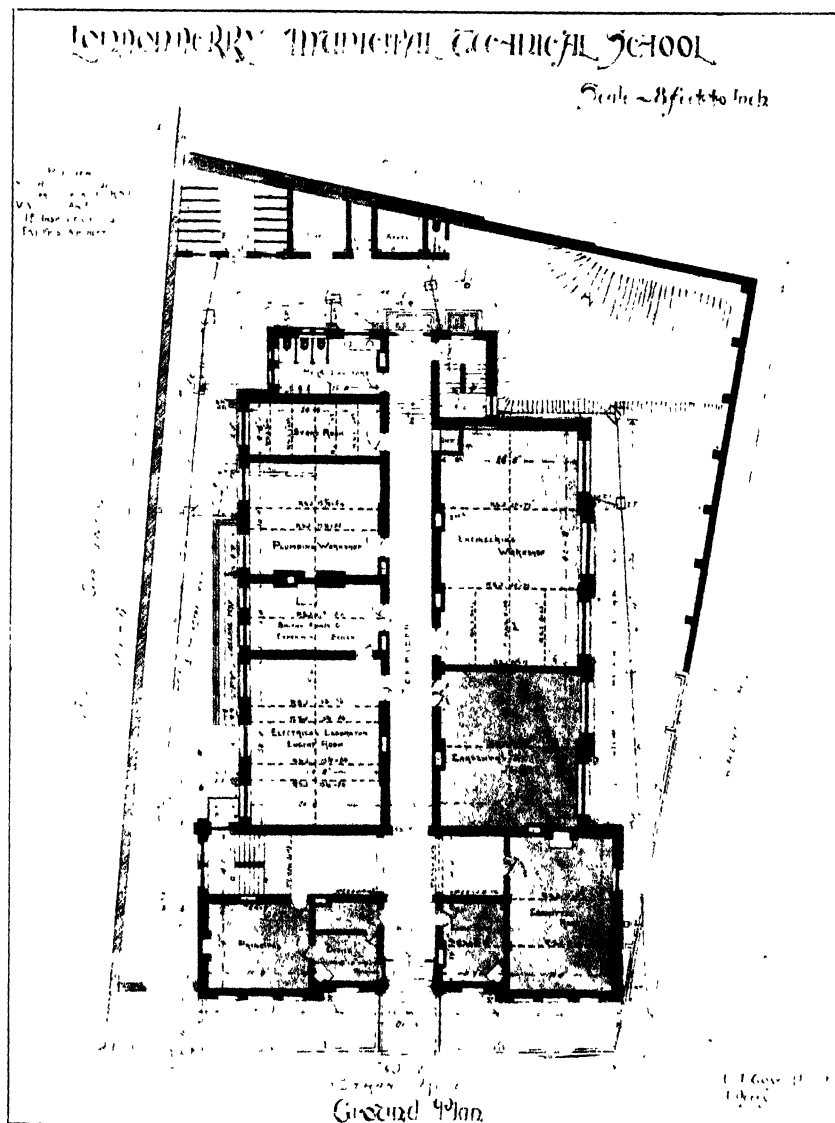
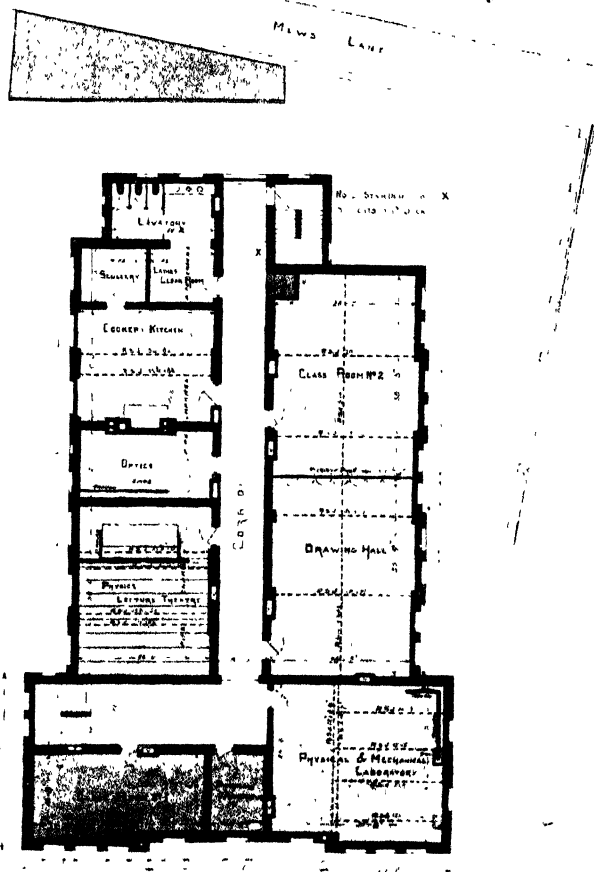


Fig. 2.—Ground Plan.

MUNICIPAL TECHNICAL SCHOOL, LONDONDERRY.

LONDONDERRY MUNICIPAL TECHNICAL SCHOOL

Scale - 8 feet to inch



First Floor Plan

J. G. H. 1900

Fig. 3.—First Floor Plan.

is the emergency staircase, leading to the upper floors. The out-buildings consist of a large bicycle shed for students' use, an acid store, and a coal store.

On Floor B (Fig. 3) are situate the Dressmaking Room, Physics Preparation Room, Physics and Mechanical Laboratory; Physics Lecture Theatre, Optics Room, Cookery Kitchen and Scullery, Drawing Hall, Large Class Room, and Ladies' Lavatory.

On Floor C (Fig. 4) are six Class Rooms, used chiefly for Lecture Work in Mathematics, Mechanics, and Commercial subjects. The whole of the space to the left of the corridor is devoted to the Chemical Department, which consists of Lecture Theatre, Preparation Room, Laboratory, and Balance Room.

With the exception of the caretaker's apartments, the whole of Floor D (Fig. 5) is devoted to Art work. There are six rooms, viz.:—Design Room, Light and Shade and Model Drawing Room, Life and Antique Room, Modelling Room, Masters' Room, and Store Room. All Class-rooms on this floor are fitted with roof lights facing north.

Heating is effected by means of low pressure hot water and radiators. The radiators, except in the corridors, are placed against the outside walls, and are arranged in sections, each section being controlled by a valve, so that a section may be cut off without interfering with the rest of the system. Each radiator is also separately controlled. The heating chamber is in the basement and contains two sectional boilers, so arranged that either or both may be used. So far, it has been found necessary to use only one of the boilers to keep the air in the building at a temperature of about 60° F.

The building is lighted throughout by electricity obtained from the town supply. Considerable pains were taken in fixing the position of the lamps to ensure maximum efficiency of lighting with least consumption of current. The Drawing Hall and Engineering Workshops are each fitted with four inverted arc lamps, and the rest of the building with incandescent lamps.

The ventilation of the building is accomplished, on the exhaust system, by means of a large fan electrically driven, fixed in the turret at the front of the building. In the outside walls, at the base of each radiator is a rectangular opening, fitted with control apparatus, leading to the outside air; on the room side of the radiator are attached baffle plates, to prevent the air passing directly through. On the opposite wall of the rooms are rectangular openings fitted with control registers, and leading into vertical exhaust ducts built in the walls; these ducts terminate in a horizontal duct formed by sub-ceiling the corridor on Floor D, and this horizontal duct leads directly to the fan chamber built in the

turret at the front of the building. When the fan is in operation, fresh air from outside passes through the rectangular openings at the base of each radiator, becomes heated by the radiator, and passes across the room to the exhaust opening, up the vertical ducts, and so to the fan chamber. The areas of the exhaust openings in the rooms were determined experimentally, and so arranged that the volume of the air in the room passes through the opening every fifteen minutes. Each register was afterwards specially made for its position.

The ventilation of the Chemical Department is independent of that of the rest of the building; special exhaust ducts, built in the inside walls, lead to a separate fan chamber. This prevents the chemical fumes reaching any other part of the building.

All gas and water pipes and electric tubes are laid on the surface of the walls, or in specially constructed troughs formed in the floors, so as to be easily accessible.

The following tables supply data relative to the sizes of the rooms, area of site, etc.:—

Rooms. Floor A.

Name of Room.	Length.			Breadth.			Floor Area.
	FT. IN.			FT. IN.			SQ. FT.
Principal's	19	0	...	15	6	...	295
Office	14	0	...	12	0	...	168
Men's Cloak Room	14	0	...	12	0	...	168
Committee Room	28	0	...	19	0	...	532
Carpentry and Joinery	28	0	...	26	0	...	728
Engineering Workshop	43	0	...	26	0	...	1128
Electrical & Steam Laboratory	30	0	...	24	9	...	745
Smithy & Boiler House	24	9	...	12	0	...	295
Plumbing Workshop	24	9	...	20	0	...	495
Store Room	24	9	...	9	6	...	232
Lavatory	19	0	...	10	0	...	190

Rooms. Floor B.

Name of Room.			Length.			Breadth.			Floor Area.
			FT. IN.			FT. IN.			SQ. FT.
Dressmaking Room	...	...	32	0	...	15	6	...	496
Physics Preparation	...	...	14	0	...	10	0	...	140
Physical & Mechanical Laboratory	..	...	31	9	...	26	9	...	855
Drawing Hall	...	...	35	9	...	26	0	...	930
Class Room. No. 10	...	...	35	9	...	26	0	...	930
Cookery Kitchen	...	...	25	0	...	20	0	...	500
Optics	...	...	25	0	...	12	0	...	300
Physics Lecture Theatre	...	...	30	0	...	25	0	...	750
Cloakroom & Scullery	...	...	25	0	...	9	6	...	237
Lavatory	...	...	19	0	...	10	0	...	190

MUNICIPAL TECHNICAL SCHOOL, LONDONDERRY.

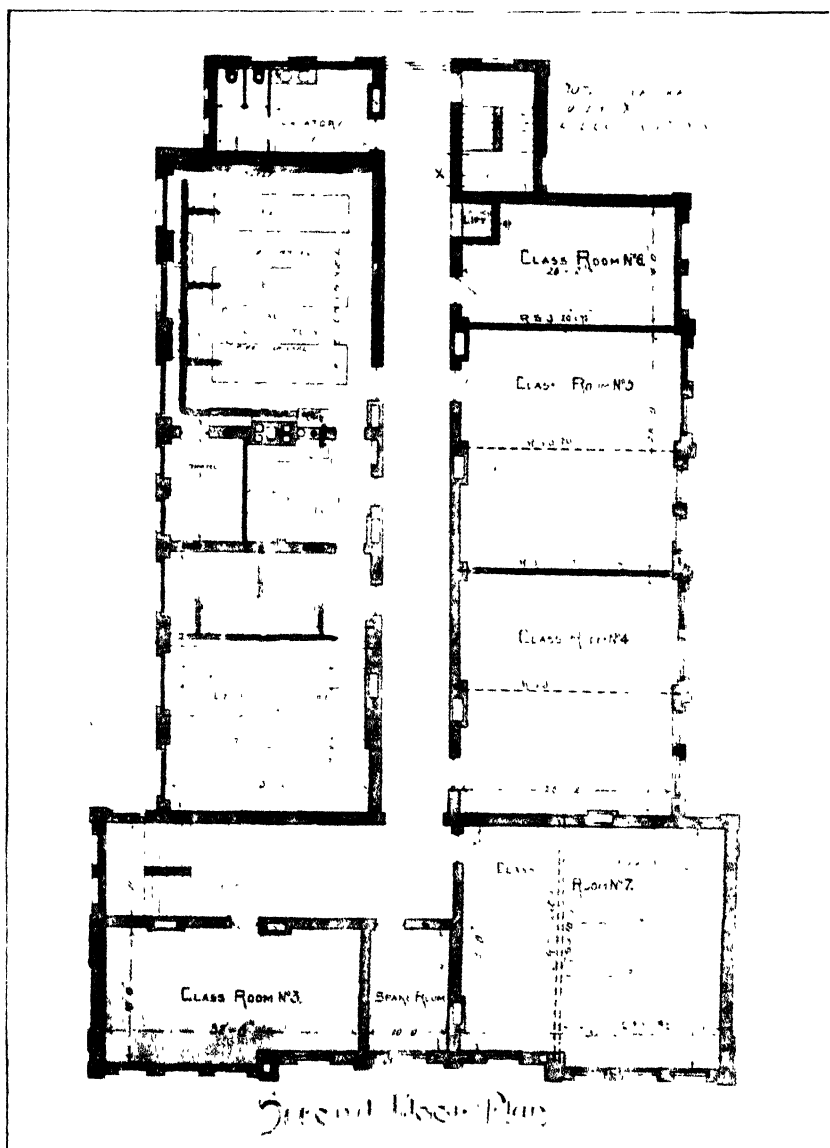


Fig. 4.—Second Floor Plan.

MUNICIPAL TECHNICAL SCHOOL, LONDONDERRY.

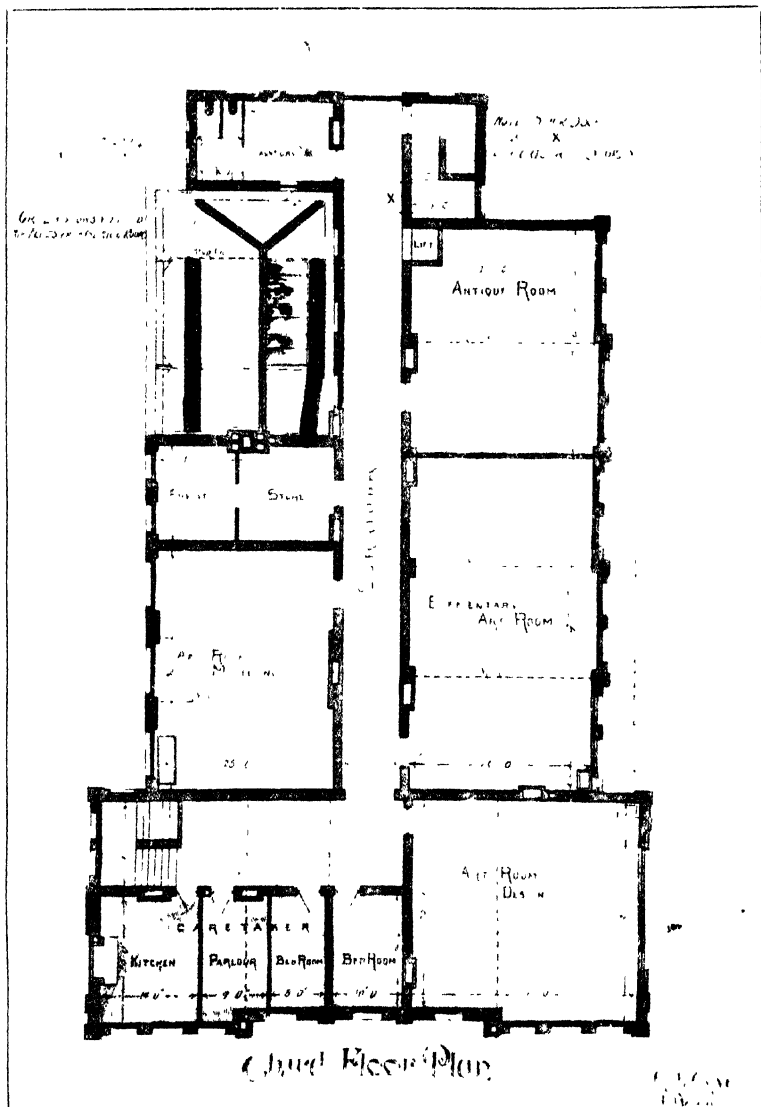


Fig. 5.—Third Floor Plan.

Rooms. Floor C.

Name of Room.	Length.		Breadth.		Floor Area.
	FT.	IN.	FT.	IN.	SQ. FT.
Class Room	32	0	15	6	496
" "	14	0	10	0	140
" "	31	9	26	9	855
" "	28	0	26	0	728
" "	28	0	26	0	728
" "	20	0	14	0	364
Chemistry Lecture Theatre	30	0	25	0	750
Preparation & Balance Rooms	25	0	12	0	300
Chemical Laboratory	31	0	24	9	768
Lavatory	19	0	10	0	190

Rooms. Floor D.

Name of Room.	Length.		Breadth.		Floor Area.
	FT.	IN.	FT.	IN.	SQ. FT.
Design Room	31	9	26	9	855
Light & Shade & Model Drawing	42	6	26	6	1125
Antique Room	28	6	26	6	756
Modelling Room	30	0	25	6	765
Master's Room	12	0	11	0	132
Store Room	14	0	12	0	168
" "	14	0	10	0	140
Caretaker's Apartments	32	0	15	9	504
Lavatory	19	0	10	0	190

Summary of Utilisation of Area.

	No. of Square Feet.
Laboratories	3108
Workshops	2646
Class Rooms	4241
Lecture Theatres	1500
Domestic Economy	1116
Art	3498
Principal's, Committee, Office, & Private Rooms	959
Store & Cloak Rooms & Lavatories	1585
Caretaker's	504
Corridors	5514

Particulars of Site.

Ground Area of Site	15650 square feet
Frontage	84 feet
Area of Ground Plan	8450 square feet
Out Buildings	612 "

Cost of Building.

Building Contracts	£9,695 18 3
Lighting	576 13 6
Heating and Ventilation	905 1 6
Plumbing and Gasfitting	755 3 9
Architect's Fees	616 3 6
Clerk of Works	306 0 0
Site	539 0 0
Law Costs & Incidental Expenses	98 17 11

£13,487 18 5

PART III.—EQUIPMENT.

After the contract for the erection of the building had been placed, the question of equipment occupied the serious attention of the Committee. The Principal was requested to undertake the preparation of the necessary plans and specifications for the furniture and fittings, and, with a view to obtaining information likely to be of use, he was deputed to visit Technical Schools in England and Scotland. As a result of this visit, much valuable information was obtained, and, where possible, was embodied in the equipment arrangements.

The first essential to be attained was, that the furniture and its arrangement should be utilitarian, and each room considered with a view to its ultimate use. Secondly, the designs to be simple, so that the furniture might be easily kept clean; and these essentials were steadily kept in view.

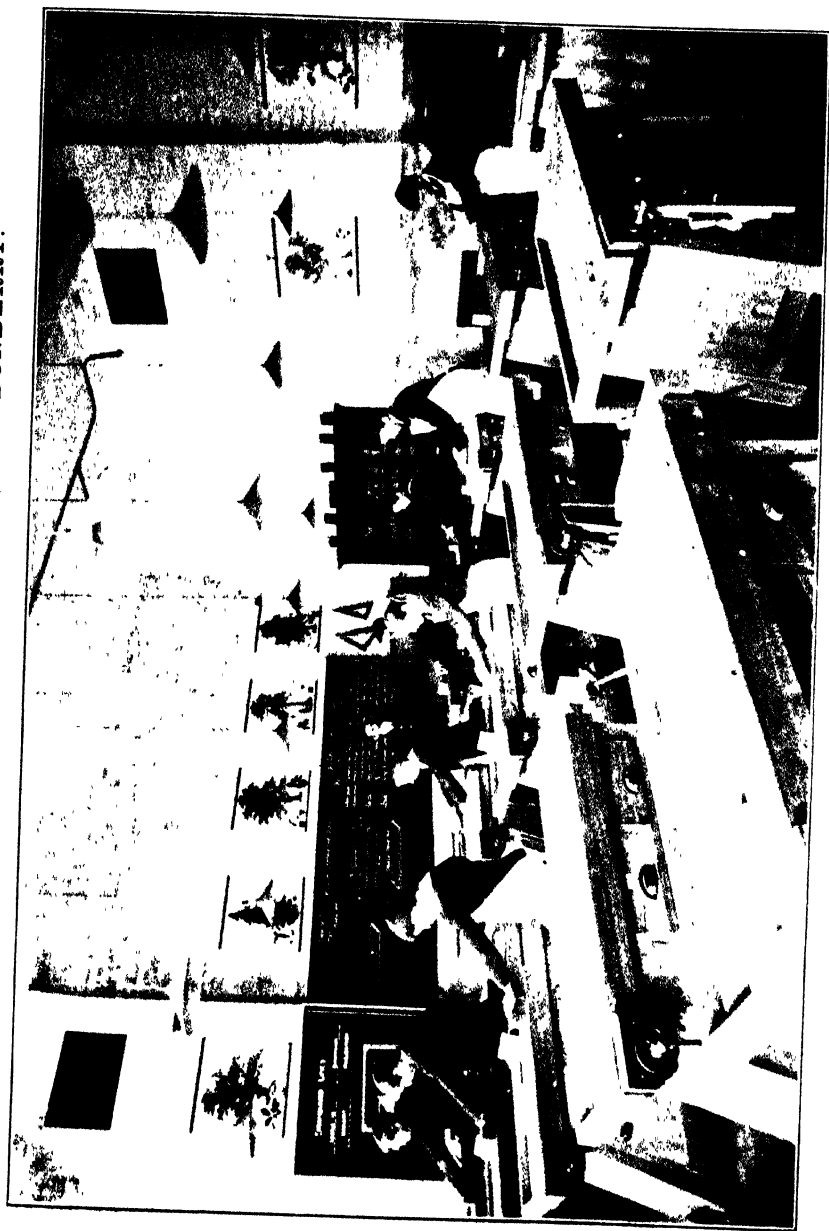
The funds for equipment of the new building were almost entirely derived from unexpended balances during the earlier years the scheme was in operation, and, by the time the building was ready for occupation, these amounted to a considerable sum. The total amount spent in equipment up to the end of session 1909-10 was £2,300. The equipment of all departments except Mechanical Engineering, is fairly complete. The equipment of this latter Department is now in progress, and it is expected to entail an expenditure of about £1,000.

The whole of the details of the equipment were very carefully thought out, and local needs continually kept in mind. Complete detail drawings and specifications were made, and tenders obtained in all cases; the whole equipment being purchased on sound business lines.

It is satisfactory to note that the contracts for furniture and fittings were in all cases secured by local firms, and the work as carried out, has given every satisfaction.

Manual Training and Carpentry and Joinery.—This room (Fig. 6) is situated on the ground floor, and measures 28 feet by 26 feet. There are seventeen single benches, each bench being fitted with Parkinson's instantaneous grip vice, together with wooden tail vice with iron screw. Each bench is fully equipped with the necessary working tools. In addition, there is a specially designed wall cupboard for the storing of special tools. The equipment of this room is still in progress, and, when finished, will contain, in addition to the above, a circular saw bench, band saw, and two wood-turning lathes.

MUNICIPAL TECHNICAL SCHOOL, LONDONDERRY.



MUNICIPAL TECHNICAL SCHOOL, LONDONDERRY.

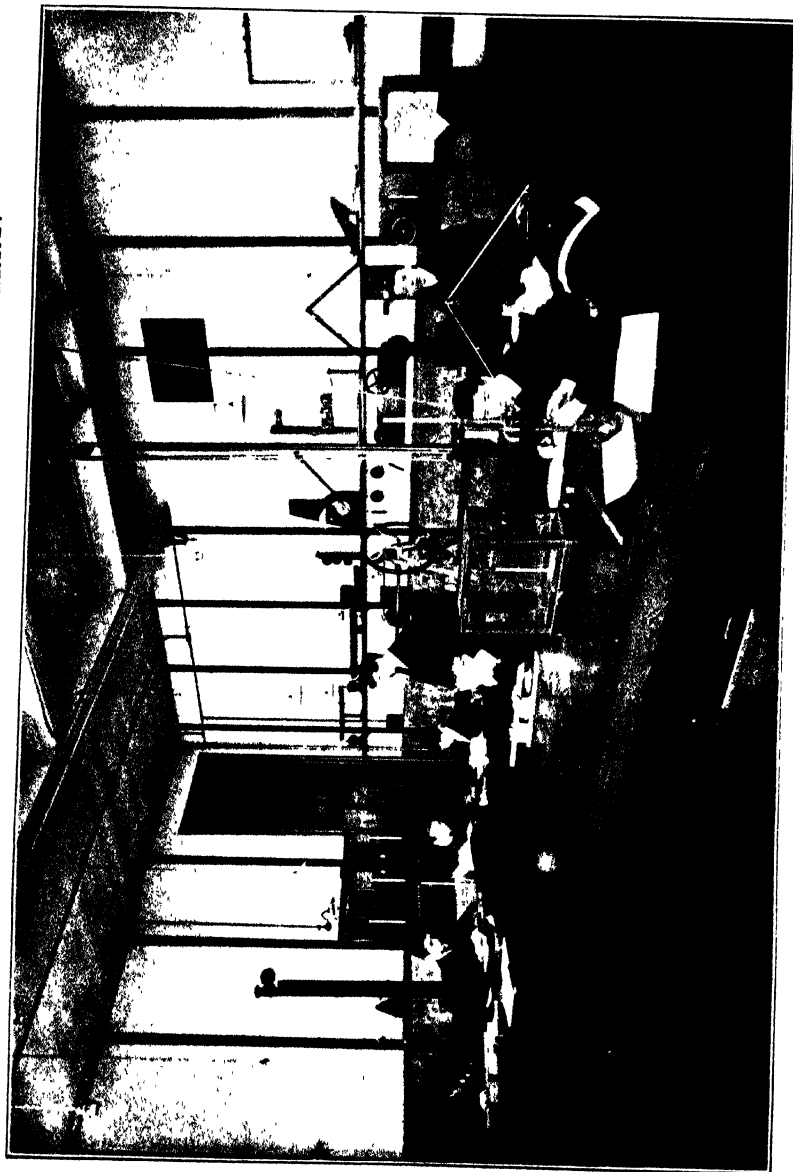


Fig. 7.—Mechanical and Physical Laboratory.

The Plumbing Workshop is on the ground floor, and measures 24 feet 9 inches by 20 feet. Benches, 2 feet 6 inches wide, with drawers on the underside, are fixed to the side walls for a length of 39 feet. The benches are fitted with eight instantaneous grip vices, and two special gas fittings for use in connection with lead melting pots. In the centre of the room is a substantially constructed bench, 10 feet by 7 feet, which is used for lead bossing, etc. Provision is also made for experiments on hot water systems. Complete sets of tools of the most modern types are provided for the use of the students.

The Engineering Department is in process of equipment. The engineering workshop, at present, contains bench accommodation for twelve students working at one time. It is hoped to complete the equipment of the necessary machine tools during the coming session. The smiths' shop contains a complete set of tools, anvil, swage block, etc., and a Sturtevant's portable forge. Provision is also made in this room for an experimental steam boiler.

The Steam Laboratory is designed to hold an experimental steam engine, together with dynamos and motors. The wiring is so arranged, that by means of a turn-over switch, a section of the building can be lighted by experimental machines in the laboratory. Want of funds has so far prevented the equipment of this room; it is hoped, however, to proceed with the equipment in the course of a few months.

The Dressmaking Room is on the first floor, and contains three tables, 10 feet by 4 feet by 2 feet 6 inches high. One bench, 10 feet by 3 feet, and ironing table, 8 feet by 2 feet; water basin, and the necessary gas irons, two treadle sewing machines, cupboard for storage of students' work, diagrams, etc. This room is also used by the class in Tailors' and Cutters' work.

The Physical and Mechanical Laboratory (Fig. 7) measures 31 feet 9 inches by 26 feet 9 inches. The fittings consist of wall benches having drawers and cupboards underneath. The drawers are fitted with special trays for storing apparatus required for the Physics, Electrical and Mechanical classes. The benches are amply provided with steel bronzed gun-metal gas fittings. Two sinks are provided on each bench, and the waste pipes lead to a laminar asphalted trough constructed in the floor, and from thence to a rain-water pipe on the outside wall. In one corner of the room, the hydraulic apparatus is fixed, being fed from a pipe in connection with a special 1,000-gallon tank fixed under the roof. In addition to the wall benches, there are two tables, 8 feet by 4 feet, in the room. The benches and tables are constructed of oak and have teak tops but-toned to the frame-work. The laboratory is fully equipped with modern apparatus for the teaching of Mechanics, Physics, and Elec-

tricity; and forty students, working in pairs, can be comfortably accommodated at one time. In addition to this room, there is on the same floor a laboratory, 25 feet by 12 feet, specially fitted for the teaching of Optics and advanced Physics; this room can also be used as a dark room for photographic purposes.

The Drawing Hall (Fig. 8) is on the first floor and measures 72 feet by 26 feet. A movable partition across the centre divides it into two rooms for working purposes. This room is fitted with twelve tables, 8 feet by 2 feet; thirty-six stools, demonstration table, cupboards for models of machine and building details, and drawing board lockers. These lockers are a special feature, being arranged in three sets of forty, for half-imperial boards, and each set is controlled by a single key. The lockers are numbered, and allocated, one to each student, at the beginning of the session. They are controlled by the teacher of the class and are opened by him at the beginning of a lesson, and when the lesson is finished each student replaces his board, etc., the locks are then secured by the teacher and are not opened until the class meets again. This system of storing the boards prevents chaos and waste of both teacher's and student's time. In addition there are twenty lockers for imperial boards. The tables are made of oak and fitted with teak tops.

The Cookery Kitchen (Fig. 9) is 25 feet by 20 feet, and is fitted with two Richmond gas cookers, and double oven range. A high pressure boiler is fitted to the range, from which an ample supply of hot water can be obtained. The room accommodates twenty students at one time, and the detail equipment is complete.

The Scullery is entered from the kitchen and measures 12 feet 6 inches by 9 feet 8 inches. It is fitted with three large porcelain sinks, cupboards, etc.

On the second floor are six Class-rooms, used chiefly for Mathematics and Commercial work. Four of these are fitted with oak dual desks, and two with tables.

The Chemical Department is on the second floor, and consists of Lecture Theatre, Laboratory (Fig. 10), Balance Room, and Preparation Room. The theatre is fitted with demonstration bench, 14 feet by 2 feet 6 inches, large sliding blackboard, and twenty dual desks. The laboratory contains six working benches, and provides accommodation for twenty-four students, working at one time. There are three fume chambers, and the waste from these and from the benches is discharged into laminar asphalted troughs constructed in the floor. These troughs have movable covers for convenience of examination and cleansing.

With the exception of three small rooms, which are used by the caretaker, the whole of the third floor is devoted to Art work.

MUNICIPAL TECHNICAL SCHOOL, LONDONDERRY.



Fig. 8.—Drawing Hall.

MUNICIPAL TECHNICAL SCHOOL, LONDONDERRY.



Fig. 9.—Cookery Kitchen.

The class-rooms are arranged with roof lights facing north, and all windows are fitted with spring blinds, so that top or bottom light may be used as desired. Special pains have been taken in the arrangement of the lighting to suit different kinds of study.

The Design Room is 31 feet 9 inches by 26 feet 9 inches, and is fitted with twelve tables, 8 feet by 2 feet; six tables, 2 feet 6 inches by 1 foot 6 inches, and one table, 10 feet 1 inch by 4 feet, together with stools, two large blackboards, lithographic press, and drawing board rack.

The Light and Shade and Model Drawing Room measures 42 feet 6 inches by 26 feet 6 inches. The equipment consists of specially designed chairs, drawing board trestles, platforms for models, geometrical and common object models, etc. The blackboards are a special feature of this room; except for the window and door spaces, they extend completely round the room. On the east wall, the blackboard is 26 feet long by 4 feet 6 inches deep, and is made of linoleum, pasted on Parien cement, with a Portland cement backing. There is a neat moulding at the top and a chalk ledge at the bottom. The other blackboards are formed on the walls; a mixture of lampblack and Parien cement floated on a Portland cement ground, and finished to a smooth surface. To obtain a satisfactory colour when finished, experiments with different proportions of lampblack and cement were made. The boards have the merit of being cheap, and have, so far, proved satisfactory.

The Modelling Room faces south, and has roof lights facing north for its whole length. Its dimensions are 30 feet by 25 feet 6 inches, and it is equipped with a large sink, 4 feet by 2 feet 1 inch by 6 inches deep; casting table, 6 feet by 2 feet; six large modelling stands, twelve galvanized iron trays with covers, model throne, eight modelling stands with revolving tops, and three galvanized iron clay bins.

The Antique and Life Room (Fig. 11) is 28 feet 6 inches by 26 feet 6 inches. It is well equipped with the necessary antique figures, easels, board rack, model throne. Above the model throne and fitted to the wall is a handsome wrought-iron swivel bracket carrying a 200 C.P. incandescent lamp. This bracket was designed by the Art Master, and made by a city firm. The whole of the class-rooms are amply equipped with casts, prints, &c.

There are two small store rooms and Headmaster's room in addition to the rooms described.

A reference to the plans will show the relative positions of the rooms.

PART IV.—THE SCHEME AND ITS WORKING.

The chief industries of Londonderry are :—Shirt and collar making, engineering, distilling, pork curing, box making, cabinet making.

coach building, bread and biscuit making, flour milling, building, and soap manufacture.

The city, owing to its geographical position, is also a large distributing centre for the counties of Donegal, Londonderry, and Tyrone.

In designing the scheme of instruction, the requirements of the local industries have been kept in view. The whole of the work is arranged in organised courses to suit the above industries, and each course extends over a period of four sessions. Special courses are also arranged for Commercial and Domestic Economy students, National and Secondary school teachers, and Art students. In the School of Art considerable attention is given to Arts and Crafts work, special classes being arranged to suit apprentices to painters and decorators, printers and lithographers, cabinet makers, stone and marble carvers, silversmiths and jewellers, and blacksmiths.

Art and Domestic Economy classes are held during the day and evening, and all other classes in the evening only.

TECHNICAL INSTRUCTION SCHEME.

1st August, 1910, to 31st July, 1911.

Population: 36,892.

Valuation: £113,502.

Value of 1d. rate, £475

SUBJECTS OF INSTRUCTION.

Preparatory Course.—English, Mathematics, Elementary Science, Drawing, Manual Instruction in Wood.

Commercial.—Commercial Arithmetic, Book-keeping, Business Methods and Office Routine, Shorthand, Commercial Law, French, Economics.

Mathematics.—Practical Mathematics, Pure Mathematics, Practical Geometry.

Science, Pure and Applied.—Machine Construction and Drawing, Building Construction and Drawing, Engineering Mechanics, Magnetism and Electricity, Elementary Physics, Sound, Light and Heat, Organic and Inorganic Chemistry, Tailors and Cutters' Work, Plumbing, Carpentry and Joinery, Shape Cutting for Shirts and Collars.

Domestic Science.—Dressmaking, Needlework, Cookery, Housewifery, Laundrywork.

Art Subjects.—Geometrical Drawing, Freehand Drawing, Black-board Drawing, Model Drawing, Perspective, Modelling, Design, Drawing in Light and Shade from Casts and Models, Principles of Ornament, Memory Drawing of Plant Form, Painting Simple Objects against light backgrounds, Painting Still Life, Painting Ornament, Drawing from Life, Repoussé Work, together with special courses of Craft Drawing for Painters and Decorators, Jewellers and Silversmiths, Printers and Lithographers, Stone and Marble Carvers, Cabinet Makers, Wood-carvers and Blacksmiths.

MUNICIPAL TECHNICAL SCHOOL, LONDONDERRY.

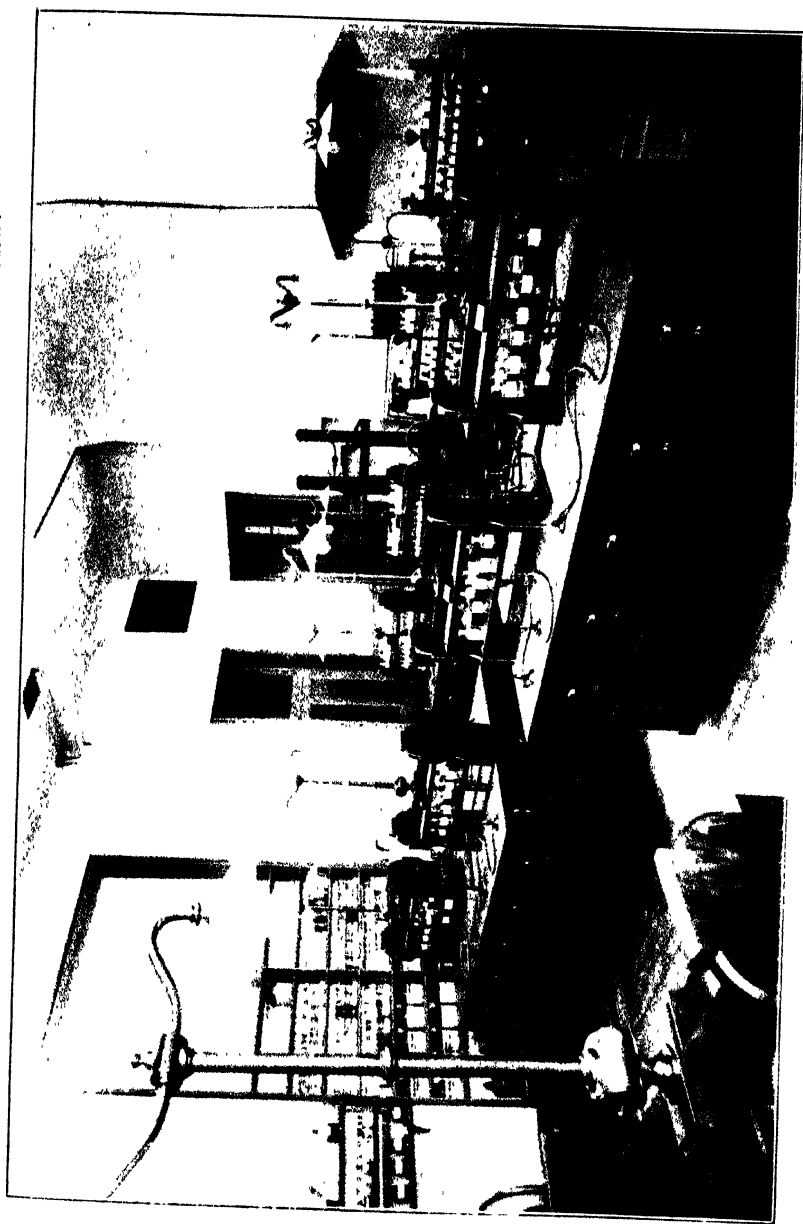


Fig. 10.—Chemical Laboratory.

MUNICIPAL TECHNICAL SCHOOL, LONDONDERRY.



Fig. 11.—Antique and Life Room.

Day Trades Preparatory School.—A Trades Preparatory School will be conducted in the Municipal Technical School, Londonderry. The aim of this School will be to provide for boys, from the age of 13, who have received an education equivalent to that of the 6th standard of a National School, such a course of training as will fit them to enter upon an industrial career. The course of instruction will extend over a period of three years, and will include—Elementary Science, Drawing, Workshop Mathematics, Manual Instruction, Practical Geometry, and literary subjects, including one modern language besides English.

The administrative staff consists of the Principal, who is responsible for the whole of the organisation of the **Teaching and Administrative Staff.** School, and also takes an active part in the teaching. The Secretary, who is a part time officer, and a Clerk engaged for her whole time.

The teaching staff consists of whole time and sessional teachers as follows:—

Whole time teachers:—

Lecturer in Mathematics, Machine Drawing, Electricity, and Elementary Science.

Lecturer in Chemistry and Physics.

Headmaster of School of Art.

Assistant Master in School of Art.

Instructress in Cookery and Laundry Work.

Instructress in Needlework and Dressmaking

Lecturer in Building Trades subjects.

Lecturer in Commercial subjects.

Sessional teachers are engaged for:—

Book-keeping.

Shorthand.

English and Mathematics.

Commercial Arithmetic.

Plumbing.

Tailors and Cutters' Work.

Building Construction.

Practical Geometry, and

Art Drawing.

During the years from 1902 to 1908, considerable difficulty was experienced in carrying out the scheme; owing to the want of satisfactory buildings, no real development could take place, and this was evidenced in the number of students taking advantage of instruction. In the session 1902-3, the number of students was 336, and in the session 1907-8, the number was 328, practically the same as five years before.

Working and Development of the Scheme.

The new school was opened for classes in September, 1908, and this was signalled by an increase in numbers to 484. New classes were added for 1909-10 and others were developed, and the number for the session increased to 568. The number of attendance hours in the session 1902-3 was 22,008, and in session 1909-10, 43,988.

The type of student in attendance at the school is now satisfactory, and the students, generally, are punctual and regular in attendance at the classes, and take a keen interest in the work.

As in all new enterprises, many initial difficulties were encountered and were gradually overcome: the object of the school was, for some considerable time, not well understood by the general public. It is pleasing to record that during the past two years, the attitude of the citizens has changed from the state of passive acquiescence to that of active interest. Many employers of labour in the city show their appreciation of the school by encouraging their employees to attend the classes; and with some firms the attendance of apprentices is insisted on.

The following tables show at a glance the numbers and occupations of the students:--

SESSION 1909-10.

	Total Class Entries	Number of Indi- viduals Enrolled
(1) Preparatory Course Classes	240	79
(2) Commercial Classes	160	78
(3) Science (Pure and Applied) & Mathematics Classes .	206	107
(4) Handicraft Classes	12	12
(5) Domestic Science Classes	366	252
(6) Art Classes	221	87

OCCUPATIONS OF STUDENTS.

	Number of	
	Men	Women
Persons engaged in Farming	1	—
Building Trades—including workers in wood, &c. ...	13	—
Coach and Car Builders	3	—
Engineers, Workers in Metal, &c. .	31	—
Architects, Surveyors, Civil Engineers, &c. .	6	—
Electrical Engineers	8	—
Printing Trades, Compositors, &c.	1	—
Tailors	12	—
Painters & Decorators	8	—
Plumbers, Gasfitters, &c.	5	—
Applied Art—Jewellers, Furniture Makers, &c. ...	2	—
Chemists, Druggists, &c.	5	—
Salesmen, Shopkeepers, &c.	23	27
Clerks in Commercial Offices	39	35
Clerks in Banks, Civil Service, Law, Assurance, &c. ...	5	—
Teachers, Assistant & Pupil Teachers	36	73
Students (University, Law, &c.)	1	1
Shirt Factory Employees	12	14
Domestic Servants	—	20
Dressmakers, Milliners, &c.	—	15
Occupations not included in above	11	8
At School	5	32
No occupation stated	2	119
Total number of Students	568	

It is of interest to state that, with the exception of Domestic Economy students, very little difficulty has been experienced in persuading students to take up suitable courses of work, and the attendance at all subjects of the courses has been well maintained.

From the table it is seen that the number of teachers in attendance is large. The Technical Instruction Committee has always encouraged the organising of teachers' classes, and it is gratifying to find this policy justified in the better prepared condition of students from National Schools who have made application for admission to the Technical School. Classes in Experimental Science, for both National teachers and monitors, have been in operation since the session 1903-04, and in Art work for many years previous to the above mentioned date.

The work of the school is tested partly by examinations held by the Board of Education, the City and Guilds of London Institute, the London Chamber of Commerce, the Society of Arts, and the Department of Agriculture and Technical Instruction for Ireland. Every facility is afforded to students who wish to sit for examinations, but no pressure is exercised by the school authorities. At the end of the session 1908-9, forty-three examinations were held in the school, and 172 certificates gained. In addition, ten Art works were accepted by the Board of Education for the Art Class Teachers' Certificate. The best test of the work of the school is that afforded by the success of its pupils; nine past students of the school have secured teaching appointments, five of these being in Technical and three in Secondary Schools in Ireland. Of others, several are now working towards positions of responsibility, success being very largely due to attendance at the classes.

Expressions of appreciation of the school and its work are often received by the Principal from past students, many of whom have left the city.

A unique feature of the work is the publication of a school magazine, produced entirely by lithography. The subject matter and illustrations are contributed by the staff and students, and afford excellent practice for the senior students. In connection with the Art Department, an Arts and Crafts Society has been at work for some years, and this Society holds a very successful Arts and Crafts Exhibition annually.

In conclusion, it may be stated that the School has now become firmly established, and its utility is to be further increased by the establishment of a Day Trades Preparatory School at the beginning of the current session. For some time, doubts were frequently expressed as to any advantage which might accrue from its work, but evidence of its success continually presenting itself to the citizens has dissipated all doubts, and the School and its work are now accepted as necessary for the welfare of the city.

As the bond between the leaders of industry in the city and the work of the School becomes more firmly fixed, so will the work increase in efficiency.

The members of the Technical Instruction Committee are looking forward to further developments, and feel confident that the School and its work tend largely to the material welfare and industrial development of the city.

"RED WATER" AND OTHER DISEASES IN CATTLE.

By A. E. METTAM, B.Sc., M.R.C.V.S., *Principal of the Royal
Veterinary College, Dublin.*

In the issue of the JOURNAL for January, 1906 (Vol. VI., No. 2, page 248), an article appeared dealing with the disease *Piroplasmosis* or *Hæmoglobinuria* in Bovines, generally known as "Red Water" in Cattle. Further researches into the cause of this disease have been carried out in the laboratories of the Royal Veterinary College, Dublin, and some of the results obtained are briefly set out below.

Recent research into the cause of "Red water" points to the conclusion that the infection as met with in "Red Water." Ireland differs from that met with in Great Britain and other countries. Red water is due to the presence in the coloured corpuscles or cells of the blood of a parasite—an animal parasite. The parasite causes destruction of the blood cells and liberation of the colouring matter which is excreted in the urine. The excreted colouring matter stains the urine and tints it red, dark red, or even black. The destruction of the many red-coloured cells may be so great as to cause death, or if the animal survives it remains thin and weak for some time. The infection is produced by the bite of an infected tick, which inoculates the living parasites into the animal at the time of the bite, or when the tick is sucking blood. The tick to be infective must be derived from the brood of a tick that has fed on a diseased animal, or perhaps the young tick earlier in its own life has fed on an infected animal. Whichever may be the true method by which the tick has been infected, there is no doubt whatsoever that the tick is the agent by which cattle become the subjects of red water: it inoculates the animal parasite which causes the disease in cattle just in the same way as the mosquito is the agent by which malaria is spread among members of the human race. In certain forms of red water it is possible to produce the disease in susceptible cattle, that is in cattle which will take the disease, by inoculating a small quantity of blood obtained from an animal that is suffering from or has recovered from the disease. After a few days interval the temperature rises, and the urine may be coloured red, brownish, or may be black. Examination of the blood shows the minute parasites in the corpuscles in smaller or greater numbers. An animal so infected remains infected even though a most careful examination of the blood may fail to

discover any parasites in the blood. In the form observed commonly in Ireland I have failed to reproduce the disease even when large quantities of the blood taken from animals suffering from the disease has been injected into animals. Further investigations are required to examine into this undoubtedly remarkable result.

Johne's Disease.

Investigations have been continued into the disease of cattle known by the name of Johne's disease. This disease is associated with wasting diarrhoea, which may be temporarily arrested, then recurs, though nothing so far as is known gives permanent relief, though good nursing and careful feeding with nourishing food-stuffs may delay death. Still no undoubted case of Johne's disease has been known to recover. Animals two years old and older are most often attacked. After death the only changes found are a thickening—often very great—of the wall of the small bowel, and sometimes of the large bowel also. There is no ulceration or destruction of the lining of the bowel. Scrapings made from the diseased bowel, examined under the microscope, after they have been appropriately stained showed many minute micro-organisms which agree in certain peculiarities with the germ causing tuberculosis. It is said that the organism causing Johne's disease has never been separated in pure culture and grown on the usual preparations in the laboratory. We have had for some time, growing in the laboratory, an organism obtained from a case of Johne's disease, and a certain number of animals are under experiment. It is too early as yet to say if the organism is the true cause of the disease. A very interesting fact has been established by Mr. Olaf Bang, of Copenhagen, who has demonstrated that the tuberculin prepared from cultures of the micro-organism producing tuberculosis in birds is able to set up a temperature reaction in animals affected with Johne's disease, and that the tuberculin is able to pick out animals even in the early stages of infection and when not suspected of being infected at all. This is a very important discovery.

In addition to Johne's disease considerable time and work has been expended on certain peculiar forms of what have proved to be tuberculosis in cattle.

Other Diseases.

During the session I received from a member of the veterinary profession the carcass of a calf about two months old, the last of twelve animals which had all died exhibiting the same symptoms. These were diarrhoea, unsteadiness in gait, eventually inability to get up, and then death. Examination of the animal's organs did not show much worthy of note or likely to attract attention; the spleen or milt was somewhat enlarged, that was all. Cultures were made from the spleen, and an organism obtained

which closely resembles, if it is not identical, with that which is known as the Paratyphoid B. It has given in special media the special reactions of that organism, and inoculated into a cow it caused first abortion and then death. The organism was recovered from the stomach of the aborted calf and from the muscles, etc., of the cow. The case is interesting, because not only is the organism isolated one which is known to produce meat poisoning in man, but because the infection from which the calf died was due to an organism pathogenic to man. It also is important to note that diarrhoea in calves may be due, as others have maintained for some time, to causes other than that which is the chief cause of white scour in extremely young calves.

During the year quite a large number of cases of black quarter or black leg has been examined, and it is worth noting that the carcasses of several sheep have been received showing well marked lesions. The results of the naked eye examinations were always controlled by microscopic and bacteriological examination.

FOWL CHOLERA AND SOME OTHER DISEASES OF FOWL.

By A. E. METTAM, B.Sc., M.R.C.V.S., *Principal of the Royal
Veterinary College, Dublin.*

Among the various diseases investigated in the pathological and bacteriological laboratories of the Royal Veterinary College, Dublin, during the past year were diseases of fowl, including turkeys, geese, and pheasants.

A number of fowl—guinea fowl and others—were sent in from time to time to the College and found to have died from fowl or chicken cholera. The infection is associated with diarrhœa, hence the term cholera, and not infrequently a number of fowl belonging to the same run die rapidly and within a few days. Among the more prominent symptoms of attack the following may be noted. The infected animals isolate themselves and stand or sit with ruffled feathers, and the comb and wattles are often deeply coloured. The discharge from the intestines is of a thin liquid character, sometimes streaked with blood, and is continually being passed. This discharge is infective and contaminates the poultry run, and this fact accounts for the spread of the disease. After a longer or shorter period the bird dies, and an examination of the organs of the body reveals the following conditions. There may be little change from the normal condition, or at most an enlargement of the spleen, a small berry-like gland attached to the gizzard. In health this gland is about the size of a currant—but in fowl cholera it may be as large as a hazel nut—dark red in colour, and soft. In other cases besides the increase in size in the spleen other organs are affected—the liver is enlarged, brownish or yellowish in colour, and may contain minute greyish specks, the result of death of minute portions of the liver. The lungs are congested, and there may be fluid in the heart sac, which rapidly becomes solid and jelly-like on exposure to the air. There is little change to be found in the kidneys, ovary, etc., but the intestine may be congested and the contents fluid, souplike, frothy, or streaked with blood. The lining of the intestine is reddened, may be dark red in colour, and the changes in the intestine explain the diarrhœa, or cholera, the name given to the disease.

The cause of the disease is a minute germ or micro organism, and it may be found, if the animal has not been dead

The Cause of the Disease.

too long, in the various organs—as the spleen—and in the blood. By proper methods it can be obtained in pure culture and grown upon artificial media and studied. A pure culture inoculated into a fowl will kill it in four, five or six days with all the signs of fowl cholera as observed in the fowl dying from the disease naturally acquired.

If the pure culture be inoculated into a rabbit, or even fed to a rabbit—as by mixing with its food of oats and bran—the rabbit dies from fowl cholera, and the micro organism can be obtained again from the organs of the rabbit. An experiment may explain. A fowl was sent in suspected of having died from fowl cholera, and an examination of the organisms proved this to be the case, the micro organism being found in the spleen. The spleen and liver were taken and pounded in a mortar, making a pasty mess, and this was mixed with oats and bran and given to two rabbits. Six days later one of the rabbits was found dead, and from its organs the germ was recovered in pure culture. The other rabbit was not infected and never showed any illness, though there is no reason to suppose that the one that died took all of the infected food. It is not easy to explain why certain animals exposed to infection are capable of resisting and escaping infection, though everyone is familiar with this fact in disease both of man and animals.

It is not known if the germ producing fowl cholera is capable of living for any length of time outside the body, but it is very probable that such is the case. In all outbreaks, it being remembered that the material from the intestine is infective, diseased fowl

Preventive Measures.

should be isolated as soon as they are observed to be ill, and any dead fowl should be burned. Healthy fowl should be removed from the contaminated run, and no fowl allowed back upon it until it has been disinfected, and any infection remaining killed or destroyed. Probably the best way to treat such a run would be to give it a good dressing of lime or lime and salt, to dig it over, and let it lie untouched until the following year. It would be courting disaster to bring back upon the infected run a new lot of fowl before the infection had been killed out or rendered harmless.

A somewhat similar disease to that of fowl cholera has recently been investigated. A number of fowls had died

Other Fowl Diseases.

from no apparent cause, and two of their number were sent into the laboratory. They were in excellent condition, quite heavy and fat. A post mortem examination showed nothing abnormal, save that the spleen

was enlarged. A bacteriological examination discovered a small micro organism differing from that of fowl cholera in that it was motile and apparently related to certain organisms found in the intestine—of the paracolon or paratyphoid variety. A closely related organism has been observed in the body of a calf.

From time to time fowls arrive in the laboratory infected with mites. These minute parasites are known as the *Cytodites nudus*. They are present in the air sacs and in the body cavity of the birds. They may be present in large numbers, and are readily observed when one knows what to look for. They are greyish in colour, about the size of a strawberry "seed," and frequently a number are gathered together, a dozen or more. If lifted up on a pin-point and put upon a glass slide or piece of paper they may be recognised readily by means of a lens. The life history of these parasites is not known nor how they reach the body cavity, and it is maintained by some that they frequently are the cause of serious epidemics among fowl. In many cases examined in the College there were no changes in the organs to account for death.

In Denmark Mr. Olaf Bang has recognised in fowls a peculiar disease, which he has named an infectious leukaemia, because a prominent feature of the infection is a grave change in the blood and in certain organs of the body. The disease is further remarkable in that it may be given to a healthy bird by inoculating blood or spleen or liver from a diseased bird, and that the cause is a living organism that belongs to the class known as "ultra microscopic," the organisms are so small they cannot be seen with the highest powers of the microscope and can pass through the pores of an earthenware filter. In affected birds the spleen and liver are both greatly increased in size, and the proportion of white blood cells in the blood is raised. The birds, after being infected some weeks, die—usually emaciated. I have had an opportunity of examining a bird which apparently suffered from this disease. The liver was greatly enlarged, it was heavier than any recorded by Mr. Bang, and there was an enormous increase in white blood corpuscles. Sections of the liver revealed large areas composed almost entirely of white blood cells. Inoculations made with spleen and liver as well as with blood and bone marrow were negative, though I hope I may have more material sent to me to investigate further this very interesting and important condition. The birds show during life great loss of condition, and when caught are found to be "light" and mere skeletons. It may be thought that they are tuberculous, but on examining the viscera signs of tuberculosis are wholly wanting. The chief and most striking change is the enlarged liver, which generally is paler than usual, or may be speckled greyish red.

Some turkey chicks were examined during the spring, and in one lot disease of the coeca was found. The bowel was quite hard and distended with a firm mortar-like material, the result of an inflammation of the bowel. The cause could not be ascertained, but it is interesting to note that the parasites, the cause of "black head" in turkey chicks in America, and coccidia were not discovered. In other young turkeys the coeca were found packed with food, and everything pointed to the young birds not being suitably fed. This opinion was given and apparently was correct, as the poultry instructor afterwards wrote and agreed with the opinion and advised change of method in feeding. No other birds were lost.

A considerable number of birds of all kinds have been received suffering from tuberculosis, and as the disease is very common a few particulars concerning the disease in birds may be useful. The cause is a micro organism closely related to that producing consumption in man and in cattle. There is grave reason to believe that the organism readily infects swine, and some cases of tuberculosis in swine have been directly traced to tuberculous poultry. The infected birds rapidly lose condition and suffer from a persistent diarrhoea. The discharges from the bowel, it is necessary to note, are highly infective, and these discharges without doubt infect the poultry run, and therefore other fowls. The birds sometimes show lameness, and may have the so-called bumble-foot, though bumble-foot may be due to other causes than tubercle—to acari or mange mites, for instance. I have found in some cases of bumble-foot the swelling fissured and discharging matter, and in this matter myriads of tubercle bacilli.

When the bird dies or is killed it is found to be very thin and wasted, and when opened grave changes may be found in the viscera. Sometimes the bowels are glued together by inflammatory material which is easily broken up by the fingers, the walls of the intestines are here and there thickened by pea-like swellings or tubercles. The lining of the bowel may be ulcerated where the tubercles are present. The liver is enlarged, and numerous firm yellow tubercles varying in size from a pinhead, a bean or small nut are present. Sometimes the whole organ is filled with minute tubercles, greyish yellow in colour. The spleen is enlarged often as big as a walnut, containing many tubercles which have run together; they may be quite firm and cheesy, sometimes hard and chalky. Occasionally tubercles may be found in the lungs, but tubercles of the lungs of birds, though far from rare, are not nearly so common as in cattle and other animals. A very remarkable case I met with in a goose may be of interest. The tuberculous infection had apparently extended from the shoulder joint through the

chest wall and invaded the lungs, but what was most interesting, the big breast muscles of the bird had become implicated. The presence of tuberculosis—that is the changes induced by the organism of tuberculosis—is not common in the flesh of animals, and is in my experience very rare in the flesh of birds.

Though it is possible for other organs, as the kidney, ovary, etc., to be infected, they are not often diseased: still one hears of eggs being laid which contain the tubercle bacilli. It is quite possible for chicks to develop from eggs containing tubercle bacilli and for the chicks to contain the bacilli in their bodies when born. Experiments made in the laboratory have proved this.

Tuberculosis of birds is a tuberculosis by ingestion; in other words, infection being taken in along with the food reaches the body through the intestine. It may readily be understood how the food is infected when it is remembered that in many cases the bowel of tuberculous birds is seriously diseased and liberating into the bowel myriads of bacilli which are cast out with the droppings. Unless the greatest care be exercised once tuberculosis appears in a poultry run it will destroy all the birds. Diseased birds should therefore be destroyed and burnt—not thrown into the dung heap—but burnt, and thus prevented from infecting other animals. An outbreak of tuberculosis in swine in America was traced to the swine consuming the carcasses of birds dead of tuberculosis.

EPIZOOTIC ABORTION.

The President of the Board of Agriculture and Fisheries appointed a Committee in 1905 to inquire into, by means of experimental investigation and otherwise, the pathology and etiology of Epizootic Abortion, and to consider whether any, and if so what, preventive and remedial measures might be adopted with regard to that disease.

The Report of the Committee dealing with the pathology and etiology of the disease was published last year (Cd. 4742—1909), but the inquiry was continued so as to include a consideration as to the administrative measures which, in view of the results of the investigation, could best be taken to deal with the disease, and to prevent the spread of infection. The Report (Cd. 5279—1910) dealing with this aspect of the question has just been published, and a summary of it follows.

The Committee declare that they are satisfied that Epizootic Abortion is a very widespread disease, and that it causes very considerable loss to stock-owners. Accordingly they consider that it is well worth while to oppose it by any reasonable measures of prevention that can be devised. It is further declared that the majority of witnesses examined by the Committee expressed the opinion that most farmers are aware that the disease is contagious, and that there is a very general agreement that the danger of introducing a cow which has recently aborted, into a healthy herd, is very widely recognised. With few exceptions the witnesses expressed themselves as strongly in favour of compulsory notification of cases of abortion and premature calving, and it was very generally agreed that a stop should be put to what appears to be a very common practice, viz., that of selling cows that have recently aborted. The Committee state the evidence laid before them on this point indicates that public opinion is ripe for the placing of restrictions on the movement of cows that have recently cast their young from contagious abortion. There is not, however, anything like so strong a general opinion in favour of placing restrictions on the movements of cows that have been recently exposed to contagion, and some witnesses were opposed to interfering with animals only suspected on the ground of exposure to risk of contagion. On the whole, the Committee are of opinion that the majority of stockholders are in favour of immediate action being taken, at least to the extent of compelling notification of the disease and of imposing

some restrictions on the movement of cows that have recently aborted.

With regard to the possible ways by which the disease might be combated, the Committee have considered two methods: (1) private, and (2) public control. It cannot be denied that some owners have succeeded over long periods in keeping their herds free from disease, but the Committee are of the opinion that private effort is, on the whole, incapable of dealing with Epizootic Abortion. Individual owners here and there may be able to keep their herds clean, but the majority are constantly exposed to the risk which attaches to the present unrestrained sale of cows that have actually aborted or come from infected herds. It is also thought that knowledge regarding the disease has reached such a point that it is possible to devise regulations which are likely to prove effective if enforced by law. Further, it is the opinion of the Committee that those whose interests are affected by the disease are in favour of State control, and they believe that the loss occasioned by the disease without any control exceeds the probable cost of the measures required to counteract it. The annual loss of which Epizootic Abortion is now the cause is enormous, and it appears to be certain that if the disease is allowed to run an uncontrolled course as at present, it will become a still more serious plague.

The Committee, therefore, recommend that as a preliminary measure Epizootic Abortion in cattle should be dealt with under an Order of the Board of Agriculture and Fisheries, requiring:—

Recommendations.

- (1) Compulsory notification of suspected cases of the disease;
- (2) A veterinary inquiry to establish the existence of the disease on any particular premises; and
- (3) Temporary isolation and restrictions on the movement of any cow that has recently aborted.

The Committee also consider that in the event of effect being given to the above recommendations that such measures as may be thought necessary should be taken to avert the possible introduction of infection in cows imported into Great Britain from Ireland, the Channel Islands, or the Isle of Man.

ROADSIDE FRUIT CULTURE IN GERMANY.

The practice of growing fruit beside the public highway, though it has never been seriously taken up in the United Kingdom, is very general in many continental countries, and nothing, perhaps, strikes the traveller more than the pleasant sight of a public thoroughfare bordered on either side with well-kept fruit trees, laden with their tempting burden and affording a grateful shade to the tired wayfarer. There is indeed something particularly attractive in the notion of roadside fruit culture, which seems to present an almost ideal combination of beauty and utility, and it is easy to understand the enthusiasm of the traveller who beholds for the first time the wealth of fruit ripening in these wayside orchards. Thus it is that glowing descriptions appear from time to time in the public Press, setting forth the profits and benefits to be derived from road-grown fruit, and urging our public authorities to start planting without further delay. So far as our climate, at least, is concerned, there is probably no reason why excellent fruit should not be successfully grown along many of our Irish highways, but many other important factors would have to be taken into consideration. These matters are outside the scope of the present article, which merely aims at giving some account of the work that has been done in this direction in the German Empire, where it is estimated that the number of roadside fruit trees is now upwards of two millions.

It may be well to say at the outset that the general characteristics of German country highroads differ somewhat from those to which we are accustomed in Ireland.

Type of German Roads. Hedges, from motives of economy of space, are extremely rare. Sometimes a slight wooden fence is erected, but more often the roads are simply bordered on either side by a deep trench, though sometimes even this is absent and the grass or arable land runs right up to the edge of the public foot-path.

Roadside fruit culture is no new thing in Germany, for some plantations, and notably those in Wurtemberg, were regulated by law at the beginning of the 19th century. The earliest legislation enacted that the fruit trees should stand in the fields at either side of the road and at a distance of 5 metres from the margin of the outer roadside trench. The owners of the fields had to plant these trees at their own expense, and of course enjoyed the proceeds of the fruit crop. But this kind of planting, which still persists in many places, has really very little to do with the actual highway, as it gives, on the one hand, no shade to the wayfarer, and, on the other, no protection from the open trench or ditch. For the past fifty years, accordingly, the trees have been

planted on the road itself, or rather on the inner side of the marginal trench. In this case both the trees and their produce belong to the State or the local authority, and adjoining land-owners must endure the shade of the trees and the encroachment of their roots without becoming entitled to any compensation. The disadvantages of this plan are that the conditions prevailing are often unfavourable to the growth of the trees, which find it almost impossible to send their roots into the hard substance of the roadway. Their root development is therefore unequal, the trees have no secure hold in the ground, and the action of the wind often makes them lean over to one side.

Nevertheless, the general tendency in Germany nowadays is to plant the trees upon the actual roadway, because it is said that the plantation, care and renewal of such trees can only be done properly and systematically by the State or by some other public authority. There are in Germany a number of well managed and profitable roadside plantations of fruit trees, which are administered by public authorities. The chief instances of these are in the Kingdom of Saxony and in the Provinces of Hanover, Brunswick and Rhenish Hesse. On the other hand, the taking over of this work by the State frequently arouses opposition among holders of roadside land, who declare that the presence of the trees depreciates the value of their property. The author of a recent work on fruit-growing in Germany ⁽¹⁾ says that in his opinion the justest and most satisfactory solution would be a system of joint ownership between the public authority and the private individual, who would share both the cost of planting and the profits realised by the sale of the fruit crop.

State fruit tree planting along the public highways has been practised in Saxony for nearly 30 years. The income realised by the Saxon Government from the produce of their roadside trees is shown below, but the table does not include receipts from the sale of old timber, which annually amount to some thousands of marks.

**Kingdom
of Saxony.**

					Amount realised by Sale of Fruit. £
1880	...	..	...	...	1,671
1885	...	...	...	...	5,710
1900	...	...	...	...	8,365
1905	...	...	...	..	10,907
1906	...	...	...	...	12,235
1907	...	...	...	...	11,728
1908	...	...	...	...	14,559

(1) *Rud. Goethe*: "Deutscher Obstbau," Parey, Berlin, 1909

In 1907, the latest year for which such information is available, the following were the numbers of fruit trees managed by the State:—

Apple trees	...	...	...	163,354
Pear trees	...	...	...	52,013
Cherry trees	...	...	...	154,077
Plum trees	...	...	...	45,633
Total	...	...	...	415,077

In addition to the fruit trees, no less than 1,322 roadside walnut trees were also under the care of the State.

The Saxon authorities, from the first, undertook the work in the most thorough and systematic fashion. The least profitable varieties have been gradually eliminated, and the staff employed by the Roads Authority is composed of specially qualified men, who thoroughly understand the care and management of fruit trees. These officials have, whenever possible, attended courses of lectures on fruit culture and, up to the present, 170 of the "tree warders," as they are called, have received instruction of this kind. Moreover, the District Road Surveyors have shown the greatest interest in the question, have become members of fruit growing societies, and arrange exhibits of street-grown fruits, all correctly named and generally in a condition which leaves nothing to be desired.⁽¹⁾ The importance of instilling a love of fruit culture in the minds of the rising generation is not overlooked in the Kingdom of Saxony. Accordingly, special courses for school teachers have been subsidised by the Government, and it is hoped that by this means the interest of the children may be aroused at an early age. Up to the present, these courses have been followed by 430 teachers.

In the Province of Hanover, and especially in its southern portion, the public authorities have devoted much

Hanover. attention to the problem of roadside fruit culture.⁽²⁾

The tree principally grown is the apple, but cherry, pear and plum trees are also planted in large numbers. The care of the trees on public roads is in the hands of the Road Authorities (Wegebau-Inspektion), who obtain the young trees required for planting partly from the Provincial Tree Nursery and partly from private growers. Each Road Inspector is assisted by a staff of rangers or "tree warders." These men, who have been specially trained under the Provincial Horticultural Inspector, plant and tend the young trees. In the fruit season, each warder has to watch over

(1) Report on the Development of Fruit-growing in Saxony; Jhb. der Deutschen Landw. Gesellschaft, Bd. 24 (1900), p. 533.

(2) Report on Fruit-growing in the Province of Hanover; Jhb. der Deutschen Landw. Gesellschaft, Bd. 18 (1903), p. 270.

a certain stretch of road, but only until the fruit has been sold, after which the purchaser must look after it. The crop is sold by auction. The fruit on a certain stretch of road is announced for sale on a certain date, the bidders assemble, and each tree is put up as a separate lot. Good trees will often fetch 45, 50 and even 70 shillings. It is possible that this system of piecemeal auction will soon be abandoned when the younger trees have come into full bearing, because the plan generally adopted nowadays is to plant long stretches of one variety of tree. It will thus be possible to sell the produce of an entire road or street to one dealer.

The example of the Hanoverian provincial and district authorities is being followed by a number of individual parishes, where the thoroughfares are now being planted with fruit trees under the care of the local authority. In such cases the State gives a certain amount of assistance to the Parish.

The Hanoverian Chamber of Agriculture have kindly supplied some particulars of their income and expenditure in respect of roadside fruit trees during the period 1905-07. From this it appears that in the year 1907 the total number of fruit trees under the care of that body was 191,796. During that year 4,986 young trees were planted; of these 4,482 were supplied by the Provincial Nursery, the balance being purchased from private growers. The young trees are required to be 6 ft. 6 in., and have a girth of about 8 inches. The following are the details of income and expenditure given for the year 1907:—

INCOME.

				£
Sale of fruit	..	..	...	9,948
Sale of old timber		.	...	53
				<hr/>
Total	...	...	...	£10,001

EXPENDITURE.

				£
Planting	..	...	...	377
Pruning and care of trees	..	..	...	2,051
Manure	...	...	...	45
Protection of trees (against pests, etc.)			...	375
Watching fruit crop		...	...	224
Disposal of crop, etc.		...	...	92
				<hr/>
Total	...	...	..	£3,164
Nett profit for the year	...	...	...	£6,837

ROADSIDE FRUIT CULTURE.

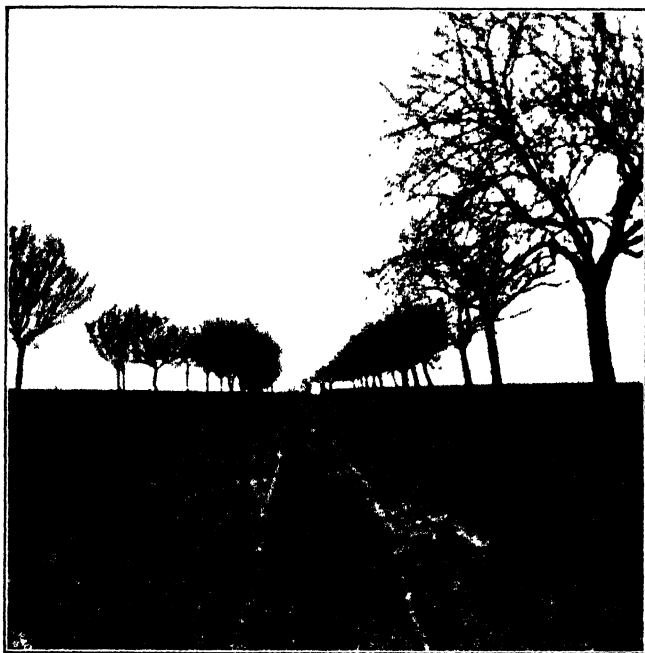


Fig. 1.—Fruit trees growing along a lane in Wurtemberg.

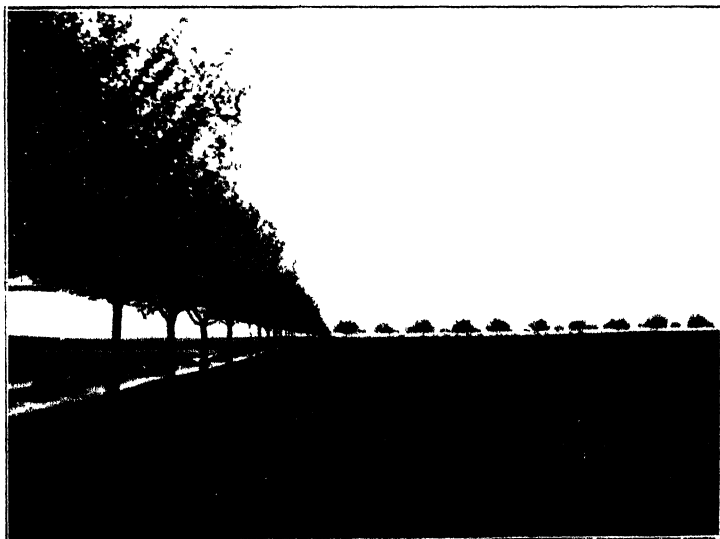


Fig. 2.—Field bordered with fruit trees, Kingdom of Saxony.

ROADSIDE FRUIT CULTURE.



Fig. 3.—Apple plantation, showing correct type of strong-growing tree.

In the Duchy of Brunswick there are some 3,083 kilometres of roads, and of these 1,580 km., or 948 miles, have **Brunswick.** been planted with fruit trees by the public authorities. Of the stock now planted, 77.4 per cent. are apple, 6.5 per cent. pear, 12.0 per cent. cherry, 3.5 per cent. plum, 0.2 per cent. walnut, and 0.4 per cent. edible bird-cherry trees.

During the last 5 years the average annual income from the roadside fruit trees was £7,850, whilst the outlay for upkeep was £2,850. The average annual cost of fresh plantation, treatment for insect pests, etc., manurial experiments and the like was £800, leaving an average nett profit of £3,700. In Brunswick the roadside fruit crop is sold in stretches to the highest bidder. For some time past extensive cultural experiments have been made in the more exposed regions with different varieties of hard fruited apples, and thus the limits have been ascertained within which profitable fruit culture can be carried on. A list of the most suitable varieties has also been got together by degrees, and from that list a selection is made for new plantations and renewals, according to the requirements of soil and climate in the locality in question.⁽¹⁾

In Upper Hesse there are some excellent examples of roadside fruit culture by public authorities. Out of 425 **Rhenish** parishes, 374 have fruit tree plantations (both **Hesse.** roadside and enclosed), containing 45,200 apple trees, 8,500 pear trees, 9,300 cherry trees, and 21,310 plum trees, which, in the period 1899-1905, brought in a sum of £28,390 at the annual fruit auctions.⁽²⁾

Some account has now been given of roadside fruit culture in three German Provinces. This by no means exhausts the list, for it should be remembered that fruit is grown along the roadside in most parts of Germany, though to a varying extent and not always by public authorities. In each of the instances given, the result may be described as satisfactory, but it must not be assumed that roadside fruit culture in Germany is invariably so. On the contrary, many plantations of the kind are said to be ill managed, yield poor returns, and, by their bad example, do much to impede the progress of the good work. The reasons assigned for this are instructive.

(1) Disregard of local conditions of climate, soil, etc. It is very seldom that a long stretch of road is equally suitable for fruit growing throughout its whole length.

(2) Ignorance and indifference of the road-keeping officials with regard to fruit culture.

(3) Wrong choice of varieties for roadside culture.

(1) Goethe: "Deutscher Obstbau," p. 86.

(2) Goethe: "Deutscher Obstbau," p. 78.

(4) **Improper methods of pruning.** There is no use in going in for formal arboriculture on the roadside, which is the worst possible place for it. Pruning should be confined to the removal of unnecessary wood from the crowns.

Goethe, the authority from which the above reasons are quoted, says that one of the principal objects of roadside fruit culture by public authorities is that the trees may serve as object lessons for imitation by private growers. When roadside trees are owned by a number of private persons, they present a very unequal appearance, because while one man understands and takes an interest in his trees, another neglects them. Uniformity of treatment and results is only possible under a central administration, whether it be the State or a county or district council. The successful transfer of roadside fruit trees from private to public ownership, and that without entailing any great sudden expenditure, is not a matter of insuperable difficulty, as was recently seen in the case of a small district in the province of Saxony. The suggestion was there made that the owners of the trees at present planted should be limited in their rights of use of those trees to a period of 30 years from the date of planting, after which the district authority should take over all expenses connected with fresh planting and the upkeep of the trees. With but few exceptions, this plan was adopted by all owners of roadside fruit trees, and since then planting has been carried on systematically, and the work already presents an instructive picture of what can be done by public bodies in this connection. Oschersleben, the district in question, has a road system measuring about 96 miles and covering a total area of some 577 acres. Of this some 250 acres, in the form of embankments, trenches and protective strips, are available for tree planting, and the leasing of the fruit trees brings in an average revenue of £1,233. As there are altogether 38,000 roadside fruit trees in the district, and of these 2,000 are still young, this only represents an average annual return of about 9d from each full-grown tree. It should, however, be mentioned that many of the older trees are past bearing and the varieties are ill chosen, and, further, that the leasing of the trees to fruit dealers is never at top price. It is intended in future to sell the fruit direct through the official staff. By this means and by the gradual introduction of a uniform and suitable type of tree, the amount of revenue should be much increased. In any case the annual income of £1,233 already realised has had a perceptible effect in reducing the burden of the local ratepayer.

ROADSIDE FRUIT CULTURE.



Fig. 4.—Diagram showing methods of planting, (A) on raised road, (B) on leveled road, (C) on sunken road.

It may seem a somewhat Utopian thing to dream of these long, orderly lines of fruit trees stretching from end to end of Ireland.

Application We are not a fruit-growing people, we even neglect
to Ireland. to utilise the blackberry crop which, out of sheer good will, flourishes in our hedges and is left to rot in tons every autumn. The case would, no

doubt, be different if luscious plums and glossy cherries were dangling within our reach, and it might be argued that these would receive a good deal too much attention from the passer-by. No doubt they would, at any rate at first, for here again, we have not the fruit-growing tradition to help us. In Württemberg or Saxony, where every cottager has his own little fruit garden, there is not much temptation to steal a public plum or a County Council apple, and besides, in many places certain roadside trees are set apart and labelled as for general use. Custom and education have made roadside fruit culture a possibility in Germany, and custom and education may do the same for us. The appeal to our pockets, at any rate, is a strong one, and the reduction of rates is a matter which no public body can afford to neglect. If such a reduction can be effected by the cultivation of fruit on roadsides and on waste strips of public land, of which there is no lack in Ireland, the subject is one which at least merits careful attention.

AGRICULTURAL MOTOR TRIALS.

The trial of Agricultural Motors, which took place from August 9th to 15th inclusive, under the auspices of the Royal Agricultural Society of England, on the farm of Mr. C. E. F. Cooke at Bygrave, Baldock, Hertfordshire, was an event of much importance to Agriculturists and Agricultural Engineers. Though in some respects the trial was disappointing, especially in regard to the small number of competitors, it, nevertheless, proved most instructive throughout. The farmer, who has much work of a mixed nature to do, such as ploughing, threshing, hauling, chaff cutting, timber sawing, was enabled to see for himself a number of machines put through a variety of tests on the land, such as would go a long way to help him to decide what type would be the most suitable, economic, and efficient in his own case. The great failing in machinery exhibits at Agricultural Shows is that the machines are staged under most suitable conditions and never seen in work under actual farm use. The oil motors looked well at the Royal Show, Liverpool, but when on field trial a number of stoppages, etc., took place, even under skilled management. To the manufacturers the trials must have been of enormous benefit; noting the defects or otherwise in their own machines and comparing the workmanship with that of others; listening to the criticisms of farmers on the work done; getting an idea from farmers of the kind of a machine really wanted for a particular purpose, and not relying too much on their own imagination of what, for example, practical ploughing really is. A very notable feature, also, was the presence during the trials of the representatives of firms who, while not themselves competitors, watched the different machines very critically at work; especially was this evidenced in the case of a firm mostly interested in double-engine ploughing tackle, whose representatives were noting every good point in the method of direct ploughing, although they themselves did not believe much in it.

The trials were not long in progress when it was very generally accepted that "Steam" and "Oil" were on test

Steam or Oil. as to their respective capabilities of furnishing motive power. Steam has now been for so long a time associated in one's mind with tractor motive power on the farm, that it is difficult to imagine the light and complicated internal combustion engine ever coming into general use. Steam has the advantage, although at the expense of economy, of carrying very heavy overloads, up to nearly $2\frac{1}{2}$ times its rated power. This is very useful in a tractor in cases of emergency. The internal combustion

engine is rated at its maximum power and cannot carry any heavy overload. Troubles with steam engines come on gradually and can be righted often without a stoppage, but with oil tractors the least defect causes a sudden breakdown, which may take place in an awkward position. The reverse gearings on oil tractors is not so efficient as on the steam tractors, although this difficulty is gradually being overcome. But oil motors have their good points, such as the short time occupied in starting, which is an important matter in farming, as power may be wanted at different kinds of work for short periods during the run of a day; when work is finished there is no waste of fuel and heat as in the firebox and boiler of a steam engine; an attendant is always necessary with the steam engine, but with the oil engine when at stationary work no attention is needed except to oil the bearings, etc., at intervals; with oil engines there is no risk of explosions, since the amount of energy stored up at any one time is very small, also there is very little risk of fire, unless, perhaps, when petrol is used carelessly; besides the efficiency of the steam engine rarely exceeds 12 per cent., whilst that of the oil engine is not far from 20 per cent. After considering the splendid working, efficiency, and economy of a portable oil engine in comparison with a portable steam engine, the idea uppermost in one's mind before the trials was:—if these oil tractors can compare as satisfactorily with the steam tractors, then farewell to steam on the farm. But an examination of the oil-motor shows that magneto's and batteries are required to ignite the petrol or oil vapour which is exploded in the ordinary oil engine, one might say, automatically at the correct moment by an ignition tube kept hot from previous explosions; sparking plugs to look after; four cylinders in general, with their attendant valves, etc., to be kept in order; and the regulating of the time of explosion which tells so much in efficiency. These things make one feel sceptical and begin to imagine the fate of the machine in the hands of a farm labourer. All the tractors on trial come within the Motor Act, which causes a great saving of attendants in comparison with ordinary road locomotives especially in towns.

It was considered that two or three days would suffice for the trials, but when the proceedings were actually
The Trials. started, owing to the amount of work to be got through, it was found that the tests would extend over a much longer time. Some preliminary work was done by the competitors on Monday, but the real work started on Tuesday, and was finished early on the following Monday afternoon.

The judges appointed were Mr. W. Worby Beaumont, M.Inst.C.E., Outer Temple, 222 Strand, London, W.C., and Mr. R. J. Bayntun Hippisley, of Ston Easton Park, near Bath, assisted by Mr. F. S.

Courtney, M.Inst.C.E., the Society's consulting engineer, of 25 Victoria street, London, S.W., and a staff of junior engineers; Mr. Claude M. S. Pilkington, of Wollaton, Nottingham, acting as steward.

The conditions of the trials of Agricultural Motors were as follows:—

A Gold Medal was offered by the Society for the best Agricultural Motor.

REGULATIONS

1. For the purposes of these Trials, an "Agricultural Motor" may be described as any form of Motor using either Steam, Oil, Petrol, or Electricity as its motive power, which

- (a) Shall be capable of hauling direct in work a Plough, Cultivator, Harvester, or other Agricultural Implement.
- (b) Shall be capable of driving such Agricultural Machines as a Threshing Machine, Chaff Cutter, Grist Mill, etc.
- (c) Shall be capable of hauling a load along a road and on the land.

2. The Machines shall be tested for efficiency in carrying out all three classes of work.

FUEL CONSUMPTION.

3. The Trials shall consist of Ploughing with a three furrow plough an area of about six acres, one part of which shall be ploughed shallow, and the other part deep at the discretion of the Judges.

4. The fuel, water and other supplies consumed throughout the Trial will be carefully noted and compared with the weight of earth removed.

PLOUGHING AND CULTIVATION.

5. Further trials on various classes of land with multiple Ploughs, and with other cultivating Implements to be provided by the Competitors, with which they may wish their Tractors to be tried, may be made at the discretion of the Judges.

6. Special attention will be paid in the Ploughing and Cultivating Trials to the weight of Machine traversing the land. The space and time occupied in turning at the headlands, and the manner in which the work is finished off.

HARVESTING.

7. This Trial will consist of hauling one or more Self-binding Reapers of not less than six feet in width round a plot of given area, cutting as far as practicable on all sides.

TRACTION TRIAL.

8. A course will be set out over roads and land selected by the Society, and each Competitor shall declare before starting, what weight he is prepared to haul over such course; the Fuel, Water, and other supplies consumed during the trial will be noted. With selected Motors hill climbing trials may be made. Motors must conform to the requirements of Acts of Parliament.

MACHINE DRIVING.

9. Each motor will be tested driving on to a pulley on a counter-shaft fitted with a brake. The diameter of pulley, speed of counter-shaft and load on brake assimilating to those on a Threshing Machine.

10. The time taken and attendance given will be noted in all trials.

11. Implements, unless otherwise stated, will be provided by the Society.

FUEL.

12. The Fuel, whether solid or liquid, will be provided by the Society. The Coal will be Welsh Steam Coal of uniform quality, and the Petroleum or other liquid of one of the recognised brands.

13. Each Competitor to state how many men will be required to attend to the Machine.

14. The following are some of the points to which special attention will be directed:—

- (a) Weight of Machine.
- (b) Weight per inch width of wheel.
- (c) Mechanical design and construction.
- (d) Adaptability to various kinds of work.
- (e) Ease of handling.
- (f) Safety of handling.
- (g) Ease of turning and space required for same.
- (h) Facility for attachment.
- (i) Attendance necessary.
- (j) Consumption of Fuel, Water, and other supplies per unit of work done.
- (k) Price.

The following is the list of entries:—

THE CYCLONE AGRICULTURAL TRACTOR COMPANY, LIMITED,
30, MOORGATE STREET, LONDON, E.C.

1—Agricultural Tractor, 18—20-B.H.P., capable of hauling 5 tons over Colonial roads, ploughing 6 acres in 10 hours, cutting 35 acres of grass in 10 hours, cultivating 35 acres in 10 hours, driving a Threshing Machine, Chaff Cutter, Grist Mill or other Farming Machinery.

2—Withdrawn.

THE IVEL AGRICULTURAL MOTORS, LIMITED, 46, POLAND STREET,
LONDON, W.

3—Agricultural Motor, "Ivel," R.A.S.E. Silver Medal, Park Royal. 1904, Standard Model, single speed, 18/20 engine, complete with vaporiser for paraffin, adapted for all classes of agricultural work, such as ploughing, reaping, binding, mowing, and is also suitable for driving a threshing machine, chaff-cutter, mill pump, dynamo, etc., £275.

4—Agricultural Motor, "Ivel," S.M. Model, two-speeds, fitted with springs, magneto ignition, 18/20 engine, paraffin vaporiser, for all classes of agricultural work, same as above, £310.

J. AND H. MCLAREN, MIDLAND ENGINE WORKS, LEEDS.

5—McLaren's Improved 5-ton Compound Agricultural Motor, or Tractor, mounted on springs back and front, differential gear, winding drum, superheater, three-speeds, injector, water-lifter, feed water heater, extra tank under the barrel of boiler, winding drum and wire rope and complete outfit, £530.

MANN'S PATENT STEAM CART AND WAGGON COMPANY, LIMITED,
PEPPER ROAD WORKS, HUNSLET, LEEDS.

6—Steam Tractor, for Direct Ploughing or general haulage, with flywheel for driving barn or other machinery; worked by one man, £400.

7—Withdrawn.

H. P. SAUNDERSON, ELSTOW WORKS, BEDFORD.

8—Universal Motor, 4-cylinder, 45—50-B.H.P. for agricultural and transport purposes, spring mounted on 4 travelling wheels, 3 speeds both forward and reverse of approximate $2\frac{1}{4}$, $3\frac{1}{2}$ and 6 miles per hour, device for locking the differential from driver's seat, and new 3 point suspension. £450.

9—Universal Motor, 4-cylinder, 25—30-B.H.P., as above, except smaller. £360.

10—Little Universal, 2-cylinder, 12—14-B.H.P., 4 travelling wheels, 3 speeds forward of approximate $2\frac{1}{4}$, $3\frac{1}{2}$ and 6 miles per hour, one speed reverse, locking gear to differential new 3-point suspension, £175. This motor carries a special plough attached to the machine, one man or boy working the whole, an important feature for a small machine. This machine fits the tenant farmer exactly.

WALLIS AND STEEVENS, LIMITED, NORTH HANTS IRON WORKS,
BASINGSTOKE, HANTS.

11—"Wallis" Compound Steam Tractor (Engine parts enclosed and running in oil bath), specially adapted for driving machinery,

hauling loads, ploughs, and all classes of Agricultural Machinery. Spring mounted, fitted with differential gear, winding drum and wire rope, waterlifter and hose, high and low pressure injectors, governors, fast and slow speeds, complete set of tools, lamps, waterproof cover, etc. £410.

Only one of the two machines originally entered by the Cyclone Agricultural Tractor Company, Ltd., was expected at the Competition, but it did not take part in the trials, thus the competing machines were limited to nine tractors representing five firms. Many visitors regretted that the oil tractor made by Messrs. Marshall, of Gainsborough, was not in the trials. This machine ploughed and hauled at the Waterford Tillage Demonstration on the 17th March, 1909. Then there is the firm of John Fowler and Co., who have done so much in double-engine ploughing that it would be interesting to see their direct tackle at work. Many of the manufacturing firms complained that the conditions of the Trials were framed with a view to testing the capabilities of small motors for farm work, and under the circumstances builders of large oil tractors, such as Marshall and Thornycroft, did not enter their machines because they could not compete unless under most unfavourable terms. The regulations for one of the tests stipulated that six acres of land should be ploughed with a three-furrow plough, and some makers declared that their engines could work four or more furrows, and that taking into account the price of the machine, its weight in running order, and superior tractive effects, the makers could not show such economical fuel consumption as might be expected from a machine designed for working with a three-furrow plough. The same facts, however, would apply to MacLaren's tractor, the subsequent winner of the Gold Medal at the Trials. The following description of the competing machines is taken from the *Implement and Machinery Review* of 1st September:—

THE COMPETING ENGINES.

“Messrs. J. and H. McLaren's 5-ton compound steam tractor is of somewhat similar design to their large traction engines, and is capable of running at 2, 4, and 6 miles per hour. The boiler is of sufficient strength for working continuously at 200 lbs. pressure per square inch; it is provided with large heating surface and great area; and all its rivet and stay holes are drilled in position, not punched. Ample tank accommodation is furnished by a reservoir under the foot-plate and a tank under the boiler barrel. One of the engine's most noteworthy features is a simple but effective steam superheater, by means of which the steam, on its way from the boiler to the cylinder, is superheated by the waste heat

in the smokebox, and enters the cylinders dry and at a high temperature, thus effecting considerable economy both of fuel and water. It is also fitted with a feed-water heater, by which the water, on its way to the boiler, is heated up by the exhaust steam to nearly boiling point, effecting, it is claimed, a further saving of fuel estimated at from 10 to 15 per cent. The engine is mounted on springs back and front; and is fitted with sensitive high speed governors, positive lubrication, differential gear (which can be locked while the engine is in motion), and an improved arrangement of spur driving gear whereby each road wheel is separately driven. An injector is provided as well as a feed pump; there are rim brakes on both the hind wheels; whilst a winding drum and a steel rope also form part of the equipment. As was proved at the trials, the engine is easily driven and steered by one man, and turns in little space. The arrangement of the spur gearing enables the engine to be readily taken to pieces; and other good features are the absence of keys in the main axle, and the provision of a special draw-bar "for coupling low down, opposite to the draught of the plough" or other implement to be operated. Any kind of machinery can be driven by belt from the fly-wheel when the engine is not otherwise engaged.

Mann's agricultural steam tractor has been specially designed for direct ploughing, hauling sheaf-binders, driving threshing and other barn machinery, and hauling a load of five to six tons upon a trailer. It has two wide roller wheels placed close together between the horn plates or girders, instead of ordinary hind road wheels coming outside of them. The weight of the engine is therefore distributed over a great width of ground, and the hind wheels do not travel over land which has already been traversed by the front wheels. Moreover, the hind rollers never have to travel over the newly-ploughed land, as by coming close together they run over the last narrow strip of land which has to be ploughed. The boiler, which is fired from the side, is of the ordinary locomotive type, similar to that used in Mann's steam carts and wagons; it will burn coal or coke; and is constructed for a working pressure of 200 lbs. per square inch. On the top of the boiler is mounted a 20 h.p. compound engine, which is provided with a large fly-wheel and governors; whilst the tank is mounted directly over the hind road wheels, and being unusually large is capable of carrying water for a long run. Topboards can be fitted above the tank to form a receptacle for carrying spare fuel, tools, etc., or when the engine is doing ordinary haulage work part of the load can be carried by the extra accommodation thus provided. A winding drum and rope are attached to the side of the engine. The weight of the tractor, which is spring-mounted, is $4\frac{1}{2}$ tons unloaded, about two-thirds of which is on the hind wheels and one-third on the front pair. Its overall length is 12 ft. 6 in.

In Messrs. Wallis and Steevens' compound steam tractor all the working parts of the engine are enclosed and run in an oil bath, thus ensuring, it is claimed, not only freedom from dust and dirt, but comparatively silent running and a minimum of wear and tear. The boiler is of the loco-multitubular pattern, and the plates of which it is built are of high-class steel; all rivet holes are drilled, and the rivets are put in by machinery under heavy pressure. Best cast-steel is used for the whole of the gearing, and all the wearing parts are of ample size. Springs are provided on the hind axle and also on the fore-carriage, a powerful differential gear is fitted on the main axle, and a reliable brake acts on the inside of the rims of both the driving wheels. Two speeds are fitted, which enable the tractor to run from "dead slow" up to the full speed permitted by law; whilst the gear for throwing out and changing the speeds is so devised that it is said to be impossible for the two gears to come into contact at the same time. Sufficient water can be carried in the tank for a long run, two independent boiler feeds are provided, and the fuel bunker is commendably roomy. The winding drum carries 50 yards (or more) of steel wire rope.

Messrs. Saunderson and Gifkins' 45-50 b.h.p. "Universal" agricultural motor is driven by a 4-cylinder engine, the bores being 6 in. and the stroke 8 in. It has a double fuel tank for carrying 8 gallons and 38 gallons of oil respectively, whilst the capacity of the water tank is 38 gallons. The width of the engine is 7 ft. 1½ in., its length 13 ft. 3 in., and its height 7 ft. 1 in.; and the size of the front wheels is 3 ft. 6 in. by 5½ in., and of the hind pair 5 ft. 3 in. by 12 in. The pulley for driving stationary machinery may be placed either at the front or in the rear of the motor, at right angles to the line of travel. The height of the pulley from the ground line is 3 ft. 6 in. Petrol or paraffin may be used as fuel; and we are assured that excellent results have been obtained with crude oils costing only 3d. per gallon. Much admired was the firm's new three-point suspension, which enables the engine to travel with facility over unusually rough ground, whilst its high mounting ensures plenty of clearance. Accessibility is another good feature of the "Universal," for both cam shafts, or any cylinder, piston, or connecting rod, may be removed without dismantling the engine. The gear box and other parts are equally accessible. Protection from dust is ensured by the suitable enclosing of the working parts. A locking gear to the differential is provided, and this is easily controlled by the driver from his seat. There are three speeds forward and reverse of about 2½, 3½, and 7 miles per hour.

The Saunderson 30 b.h.p. "Universal" is built on the same lines, though proportionally smaller throughout. In this case, the 4-cylinder engine has 5 in. bores and a 6½ in. stroke, the overall dimensions of the tractor being—width 6 ft. 7 in., length 12 ft.

5 in., height 6 ft. 4 in. The front wheels are 8 ft. by 6 in. and the rear wheels 4 ft. by 10 in., whilst the capacities of the fuel tanks are $6\frac{1}{2}$ and 26 gallons respectively, and of the water tank 22 gallons. The height of the pulley centre from the ground line is 3 ft. The three speeds (both forward and reverse) of this engine are, approximately, $2\frac{1}{4}$, $3\frac{1}{2}$, and 6 miles per hour.

The two Ivel agricultural motors differed little from each other, the principal difference being that one was a single speed and the other a two-speed engine, both of from 18 to 20 h.p. The latter is, however, spring mounted, and has magneto ignition. The "Ivel" was introduced nearly eight years ago by the late Dan Albone, and has been awarded 31 gold and silver medals, including a silver medal from the Royal Agricultural Society of England, and a gold medal from the Highland and Agricultural Society of Scotland. The weight of the engine, which is 32 cwt., is distributed over three wide wheels, and therefore makes but little impression on the land, and when packed for shipment in a crate 9 ft. 10 in. by 6 ft. 4 in. by 5 ft. 8 in., its gross weight is 2 tons 8 cwt. The vaporiser is so designed that paraffin, kerosene, or alcohol may be used as fuel. The "Ivel" has a simple, double-cylinder, governed engine, the power of which is transmitted through a friction clutch, and thence by chains to the back axle, to which are attached the driving wheels. For stationary work, such as the driving of threshing, grinding, chaff-cutting, and pumping machinery, a pulley is coupled direct to the engine.

The "Little Universal" Motor, although on the ground, was not tested by the judges, and was only now and again used to cut a furrow, but its presence created much curiosity as to its utility, and we saw it produce a little shallow ploughing satisfactorily."

On Tuesday the opening test was the ploughing by three of the competitors of 6 acres of chalky land off which a crop of clover had been sheep fed, and some farmyard manure applied to be ploughed in. Rain fell on Tuesday morning, which slightly delayed operations, but did not affect the soil much. After the preliminaries of weighing out the fuel and water had been completed, two steam motors, McLaren and Mann, and an oil motor, the Ivel single-speed, started work (Figs. 1, 2, 3, 4). There was no difficulty experienced by any of the motors in turning over three furrows 9 inches wide by 5 inches deep. The length of the furrow was 460 yards, which necessitated a minimum amount of turning at the endlands. The space usually left

by the competitors at the ends for turning was about 80 feet, and when the plot to be ploughed was within 80 feet of completion on each side the motors commenced to plough round the ends, finally leav-

AGRICULTURAL MOTOR TRIALS.



Fig. 1.—Typical 3-furrow work, 9 inches wide and 5 inches deep.
(Mann's Engine.)



Fig. 2.—McLaren's Motor and Howard's 3-furrow Plough.

AGRICULTURAL MOTOR TRIALS.

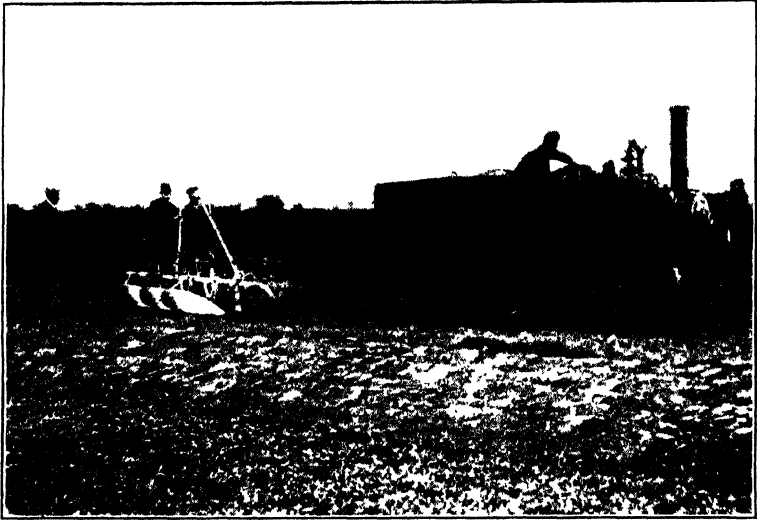


Fig. 3.—Mann's Tractor and Howard's 3-furrow Plough.

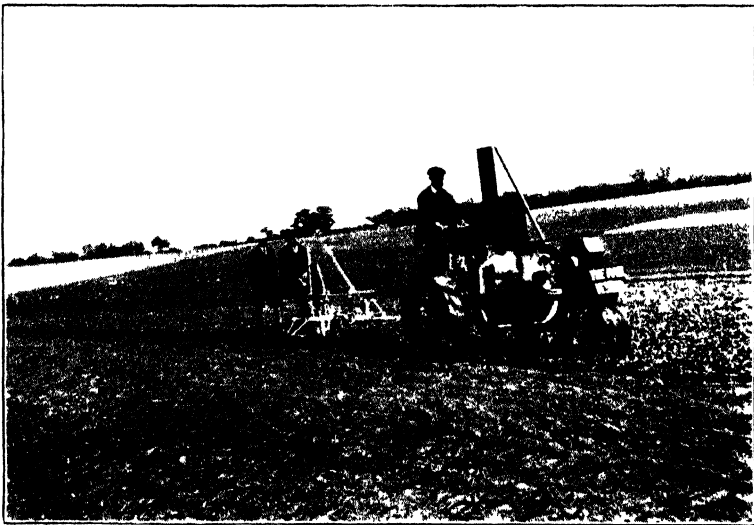


Fig. 4.—The Ivel Motor and Howard's 3-furrow Plough.

ing a more or less triangular-shaped piece unploughed at the corners, which would be measured against the competitor. A square yard of the land ploughed was taken up at various points in the competitors' work and weighed. The MacLaren motor worked at about 5 miles per hour, the Mann at 4, and the Ivel at $2\frac{1}{2}$ miles per hour. The rapid rate of travel in the McLaren motor broke the furrow a little, and would make the after cultivation more easily effected. The back wheels of the machine are 12 inches wide, and fitted with narrow spudlets 5 inches by 4 inches for ploughing. The Mann tractor has two back wheels, each 21 inches wide, thus spreading the weight on the land. The diameter of the wheels is 4 feet. The wheels are mounted inside the frame, giving the machine an unstable appearance, especially on sloping ground. However, owing to the rain that had fallen these broad wheels levelled the manure, clover and soil in front of the plough, thus enabling the furrows to be laid over in a very evenly manner. The Ivel, which travels with one of the back wheels in the furrow, got through with the work slowly, but steadily. The lightness of the machine gave it very little hold on the ground, and the movement was jerky as each "spud" took a grip of the soil. However, the subsoil was not rendered near so firm on the plot ploughed by the Ivel as where the steam motors had worked. Moreover, one wheel travelling in the bottom of every third furrow was objectionable.

The ploughs used were identical in every case, and had been supplied by Messrs. J. and F. Howard, of Bedford, being designed to turn three 9-inch furrows. Visitors were somewhat disappointed at not being allowed to inspect the machines more closely while working. Certainly this made it more or less impossible to estimate the capabilities of the machines, since no idea as to the reason for some of the stoppages which occasionally took place could be ascertained. During the early stages of the trial, turning at the headlands was somewhat troublesome to the competitors, necessitating the services of two, and sometimes three, men to haul the plough into position, but as the "gathered" ridge widened, less trouble in this respect was experienced, with a consequent saving of time. However, a "swivel" wheel on the plough would have saved much of this labour, and besides a better method of attachment to the motor could be devised. Deeper work than 5-inch was desired by many visitors, but it was officially explained that it would have spoiled the land to go deeper. No complaints could be made as to the manner in which the ploughing was done.

On Wednesday the remaining four engines, the Ivel two-speed,

two Saunderson "Universals," and Wallis and Steevens' tractor (Figs 5, 6, 7), were put through the same tests. The "Wallis and Steevens" was the only steam tractor at work on this day. The Ivel again got through with the work steadily, but the Saunderson motors were very frequently held up. The "Wallis and Steevens" did good work, especially after the "spuds" had been removed from the back wheels, the ground having dried sufficiently for the wheels to take a hold. The driving wheels are each 16 inches wide, which spread the weight over a large surface. However, injector troubles delayed the machine at times. Taking the ploughing as a whole, it was very well done, and although many visitors stated that the ground was too favourable, still a good comparative idea of the quantities of water, coal, oil, and time consumed in practically doing the same work by each competitor was obtained, and to this the judges are bound to give due consideration in framing their report.

Some of the engines were put on the "Brake" test on Wednesday. The driven pulley on the brake was similar to that used on standard threshing machines. The engines ran reverse, thus placing the pull on the under belt and giving the greatest amount of belt surface under friction on the pulleys. The brake

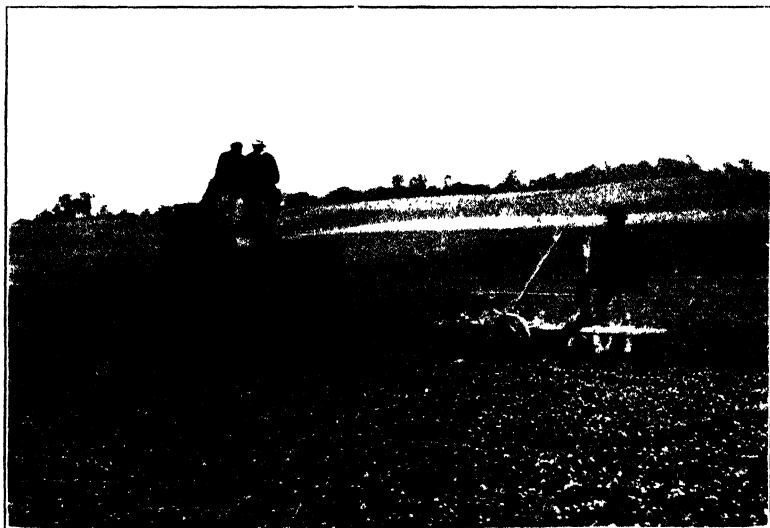
"Brake" Test. wheels were each two feet in diameter. The amount of fuel and water consumed during the four hours' test was checked against the steam motors, and the amount of petrol and oil consumed by the oil motors during a two hours brake test. The percentage of slip of the belt in each case was determined, but none of the above figures could be ascertained from the experts in charge.

On Thursday the "brake" tests were continued by some of the motors. The number of revolutions in the oil motors was very great, so that for threshing purposes the driving pulley is very small, and when a 65-foot belt is used the weight of the upper belt brings it to rub on the under belt, and arrangements had to be made in the "brake" test to prevent this. It is generally recommended by the makers to use short belts to prevent such rubbing. In oil engines the propulsion is so sudden that belts are much strained and stretched in working. Steam has a more gradual and expansive pressure. The driving pulley on the Saunderson motor is placed transversely on the front of the machine, so that it seems to be difficult to attach to a thresher, and in cases of belt-slipping a straight backward motion cannot be given. The makers say, however, that there is a convenience, in this position of the driving pulley, as the machine can be run in between the individual stacks in a row and the thresher down the space between two parallel rows. If stacks were built with such precision as to warrant this, it is well and good, but as a rule in the country, stacks are not built with such due regard to lengths of belt, etc.

AGRICULTURAL MOTOR TRIALS.



**Fig. 5.—Saunderson's 25-30 B.H.P. " Universal " Motor and
Howard's 3-furrow Plough.**



**Fig. 6.—Saunderson's 45-50 B.H.P. " Universal " Motor and
Howard's 3-furrow Plough.**

AGRICULTURAL MOTOR TRIALS.



Fig. 7.—Wallis and Steevens' Tractor and Howard's 3-furrow Plough.

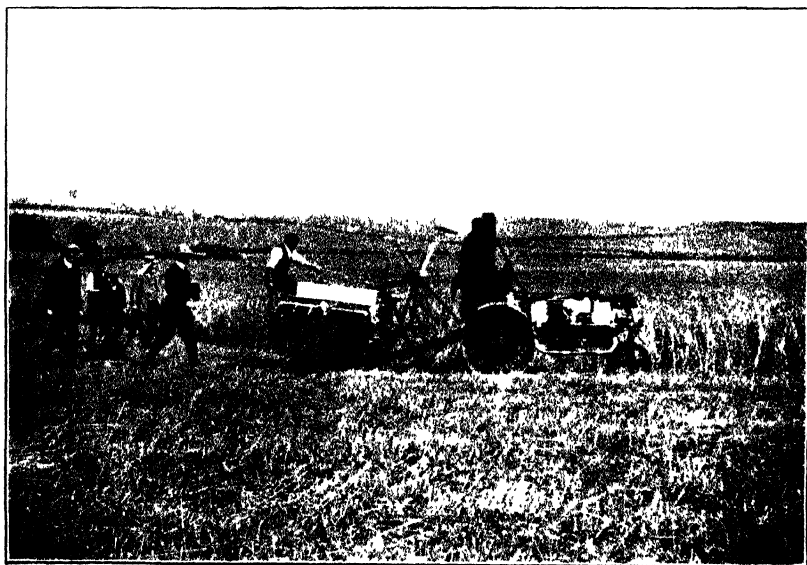


Fig. 8.—The Ivel Agricultural Motor working a 6 ft.
"Albion" Binder.

A trial of the different motors in hauling binders was conducted on Thursday. This was done in a large field of wheat—a standing crop with no grass or weeds in the “butt.” The day was very warm and calm, so that the conditions were ideal. Each motor hauled two 6 ft. binders of the Harrison-McGregor build. Mann’s tractor got through with the test in a satisfactory manner. The Ivel proved unable to haul two machines. MacLaren, Wallis, and Saunderson worked in the afternoon (Figs. 8, 9, 10, 11). This seemed to be an easy test, as the conditions prevailing were perfect. No check was kept as to fuel and water consumed or time of doing a given area. The machines were put through tests of turning on a given space. However, this feature is not of so much importance as in ploughing, and the difficulty in turning was chiefly caused by the coupling up of two binders. The work was very well done, the mechanism of the binder being driven at a more evenly speed than when horses are doing the work. The Wallis tractor hauled the two binders twice the length of the field in 10 minutes, travelling at the rate of about 5 miles per hour, the binders doing the work very well at this speed, although it is possible the machinery could scarcely continue running at this pace for many days. Under these ideal conditions an amount of work could be got through in a short space of time, which would be of great consequence in this climate, besides there would be no difficulty in continuing if necessary through the night. In comparison with horse work, teams of three heavy horses working in the same field were being changed every three hours, although not doing half the width nor travelling so quickly as the tractors.

On Friday the haulage tests were carried out whilst some of the tractors were finishing the brake test. The MacLaren tractor and the Mann tractor started on a 24 mile course with some stiff gradients, hauling a gross load of 8 tons. The Mann tractor carried part of the load on the top of the tank, thus giving the machine more pulling weight. The MacLaren tractor did the journey in about 2 hours and 50 minutes. Some difficulties with a hot shaft delayed the Mann tractor. The Wallis tractor got round the course in about 2½ hours without difficulty. The Saunderson got through, but not so rapidly as the Wallis.

On Saturday the smaller Saunderson started on the haulage test with a gross load of 5 tons, but the performance was not good. One of the Ivels made a good journey with a gross load of three tons. The light weight of the tractor is much against it for haulage purposes.

On Saturday the chief interest centred round the tractors engaged in what was termed deep ploughing. The land was

heavier than in the previous tests, and the depth about 9 inches. As the field had been ploughed **Deep Ploughing.** about 5 inches the previous year, $3\frac{1}{2}$ to 4 inches of firm bottom soil had to be raised.

In the hauling of the three furrow Howard plough there was not any difficulty experienced by Mann and Wallis, still the ploughs did not turn the furrows well, and one of them got damaged. The ploughs were too light, and the last body could not be kept in the soil. The MacLaren tractor found no difficulty in hauling the plough. It was then attached to a three-furrow plough of MacLaren's own make, which approximated with its straighter breast and more abrupt mouldboard to the digging plough generally used on stubble in this country. The work done by this plough was superior to the other. But when a six-furrow plough was attached to the tractor she was not able to finish the run round satisfactorily, although ploughing only 5 inches deep. Saunderson's motor stopped so often in the journey forward and back that all patience was lost with oil motors. The ploughs working 9 inches deep were doing approximately the work of 6 strong horses and the movements were more rapid. In the morning McLaren's engine was working the dynamometer on the field where the ploughing tests were carried out on Tuesday and Wednesday to ascertain the pull necessary to turn the furrows on each plot. McLaren was awarded the gold medal on Monday. Much discussion took place during the Trials on the question of direct and double-engine ploughing and the general abilities of the steam tractor for other work. The oil motors were very soon left out of the question.

In ploughing with a rope about $\frac{1}{4}$ of the engine efficiency is lost, leaving $\frac{3}{4}$ for actual work, whilst in direct traction **Some Lessons.** it takes 50 to 65 per cent. of the power to move the engine over the land. In direct ploughing the weight, with water, etc., will approach 6 tons, and this passing over the land once every 27 inches will certainly consolidate the bottom sub-soil, and on many fields it could not be done at all. On hilly land direct ploughing would be of no service.

The winding drum being on the hind wheel these tractors are not suitable for rope-hauled ploughs, as they would require to be "set" and blocked up for each draught. Whereas in agricultural locomotives for this work the winding drum is under the boiler and winds horizontally, so that in ploughing, the engine is always in the direction for moving along the headlands as the ploughing proceeds, also they require no scotching. This drum might be taken off when used for threshing or hauling on the road. Under very favourable conditions the tractor will get through a lot of hauling, ploughing, harvesting, also threshing if a small sized finisher is used, say, not exceeding a 4-foot drum, and other work of the farm. The outlay will be £300—£400.

AGRICULTURAL MOTOR TRIALS.



Fig. 9.—McLaren's Motor working two 6 ft. "Albion" Binders.



Fig. 10.—Wallis and Steevens' Tractor working two 6 ft.
"Albion" Binders.

AGRICULTURAL MOTOR TRIALS.



**Fig. 11.—Saunderson's 25-30 B.H.P. "Universal" Motor working
two 6 ft. "Albion" Binders.**

In hauling, the tractor will do the work of 8 horses and save 6 men ordinarily, and do the work at a quicker rate. In ploughing it will do as much per hour as 2 horses per day, and when idle requires no food.

The judges' Report when published should furnish many items of extreme interest both to farmers and agricultural engineers, and enable a definite idea to be formed of the relative costs of horse and motor power in farm work under similar conditions.

The Department is indebted to the Editor of *The Implement and Machinery Review* for the use of the " blocks " of **Acknowledgment.** the illustrations accompanying this article.

BOOTMAKING IN IRELAND.

By E. J. LONG, Vice-President Irish Tanners' Association.

In the issue of the Department's JOURNAL, Vol. II., No. 1, page 49, an article appeared giving some account of the principles of boot and shoe manufacture in Northamptonshire. This was written by Mr. E. Swaysland, a teacher of boot and shoe making in Northampton. The object of the article was to place at the disposal of Urban Councils and other Local Authorities engaged in framing Technical Instruction Schemes some particulars on instruction in a branch of industry which is somewhat widely distributed in Ireland. The following paper, which may be looked upon as a complement of Mr. Swaysland's article, deals in a practical way with some of the present-day difficulties facing Irish boot and shoe manufacturers.

It cannot be said that at present boot manufacture is an important industry in Ireland; yet not much more than fifty years ago most of the boots worn in Ireland were manufactured by hand in this country. To-day the most of that trade is lost, and we import from the sister country the majority of the boots we require, as the following figures show:—

Statement showing the Value of the Boots and Shoes imported into Ireland in the Years 1905-1909.

Year.	Value.
	£
1905 ..	1,544,917
1906 ..	1,696,294
1907 .	1,728,178
1908 .	1,750,987
1909 .	1,791,908

The change not only means a large amount of wages lost to this country, but also a considerable loss to the tanning trade, as these imported boots are entirely made from leather of foreign manufacture.

The present depressed condition of the Irish Boot-making trade has been discussed at meetings of the Irish Tanners' Federation from time to time, and, as a result, a deputation waited on the Department of Agriculture and Technical Instruction to see whether some steps could not be taken to prevent the further decline of this important branch of industry. It was decided as a first step to visit a boot-making centre in England with the view of seeing what was being done, and to obtain some idea of the organization, machinery, and capital necessary. The deputation had first to

decide what boot-making centre to visit, as districts in England specialise in producing different classes of men's and women's footwear. For instance, Leicester and district make ladies' goods in great variety, Northampton chiefly best quality men's, Leeds heavy men's common, Bristol and district heavy men's and women's. The workers are thus trained and continue to work on a certain stamp of goods, and become more expert on one line than if they were changed about from one class to another. Finally, Kingswood, near Bristol, was selected as the best to visit, because—1st, it produced that class of boot which was bought most largely in Ireland by those engaged in agriculture, male and female; 2nd, some kinds of boots made in Kingswood are now being made in Ireland, and therefore as the industry in these classes of goods is native to some extent, it ought to be the easiest to revive and help forward. In this connection it may be mentioned that nothing but praise can be written of the products of the boot factories which are already in Ireland successfully competing in almost all classes of boots with their rivals. They do their business well and deserve the success they are achieving, but they are not yet able to produce more than a fraction of the demand for low-priced goods. The remarks here made are intended solely for the small county bootmaker.

Messrs. C. J. Dunn, J.P., of Cork, E. J. Long, of Limerick, and J. Madden, of Dublin, accompanied by Mr. George Fletcher, Assistant Secretary in respect of Technical Instruction, visited Kingswood in November of last year and interviewed several manufacturers, saw several factories while at work, and investigated what was being done, and further (for the first time in the experience of some of the deputation) were introduced into the homes of some of the bootmakers, where the occupants make boots and shoes by hand labour in small rooms built at the back of their houses, competing successfully with the factories run entirely by machinery. In some cases the employers get all their boots made by hand. In many instances those who run factories also get a large number of their boots made by hand. In all cases the hand-made articles are made as cheaply and in many cases better, and, for certain purposes, find a readier sale than those made by machinery.

It is worth mentioning here that a large boot factory visited on this occasion, the proprietor of which is one of the principal men engaged in the industry at Kingswood, had been fully equipped in 1908 with the most modern machinery, on trial, to see whether better goods could be produced in this way than by hand—the proprietor deciding that if not it would be put out, and he would again revert to hand labour. In November last, when the deputation called, it was rather a surprise to find that this gentleman's experience of machinery was such that he had got rid of all the complicated and expensive rivetting, nailing and heeling machines, retaining only

the simple and easily-worked sewing machines for upper making, and the machines for finishing, which are also small and inexpensive. He told us he got better boots by hand labour, and the deputation saw the largest portion of his staff rivetting, soling and heeling boots entirely by hand. These boots have a good sale in Ireland. So much for expensive machinery. Another manufacturer, who also very kindly showed us over his premises and introduced us to some of his employees working at their homes, gets all the boots he sells made by hand labour outside and finds a ready market for them in Ireland. He only cuts the materials and puts the uppers together. A great number of our country shoemakers do exactly the same, as far as cutting the materials and the closing of some uppers is concerned; but they do not attempt to produce a boot to compete with Kingswood, because they have not men who can as rapidly put it together in the same manner—that is, rivetting the soles and heeling by hand, and finishing it either by hand labour or machinery. The majority of Irish country bootmakers produce either “pegged” or “stitched” goods. Why cannot these men make rivetted boots by hand labour as well and as cheaply as is done elsewhere? If we want more employment, ought we not try to do so? There are no insuperable obstacles—only a little more training in small details, some extra skill, better organization, more knowledge on the part of the employer, quicker methods and better tools on the part of the workmen, and an attempt by our small manufacturers to make the same class of article as is sold in every town and village in this country, and in many cases at many of our wayside shops.

People will have, and must get, cheap boots. It is useless for the Irishman to say “my make is better although it is dearer.” That does not appeal to the man who has not enough money to buy the more expensive article. He must buy for the money he has got, and, as a matter of fact, he often gets very good value for the smaller sum of money. Some attempt ought to be made to capture most of this big trade in ready-made rivetted boots.

A very large proportion of the boots described and which are made at Kingswood find a ready sale in Ireland, and it may here be stated that the writer of this article has on many occasions inspected this manual industry at Kingswood, both in the larger factories and as it is carried on as a cottage industry, and further, he sells the goods in Ireland in large quantities, and is convinced that the home industry, if introduced here, as practised at Kingswood, could be made highly successful in the country districts of Ireland, were operatives trained to work in the same up-to-date and skilled way as they do there. Let it be said here that those employed in Kingswood and Bristol making boots and shoes at their own homes earn good wages, live in better houses than do our similarly engaged people, and have every evidence of comfort in their surroundings. One of the deputation

had the idea that this was sweated labour, but on his inspection of the conditions and the wages earned, changed his opinion, and bought some of these hand-made boots during his visit to sell in Ireland.

The methods these home workers employ copy to a great extent the operations done by the machines, and in a great many cases the whole family might be engaged in production—the girls closing the uppers with the aid of sewing machines, just a little stronger and no more expensive than the ordinary family sewing machine used in domestic work, and again may help to finish the boots when they are rivetted by the men and boys. With regard to the boys it may be noted that it takes only about two years to train an average boy to become an expert worker.

Outside of the boot factories in Ireland there are but few places in the country where boots are made by hand on lines similar to those prevailing at Kingswood, but where it is done it is successful, and is practiced more in the north than in the south. Our methods are suited to boots stitched by hand, but are entirely unsuited to rivetted goods, which are made most rapidly—usually a pair per hour in Kingswood—are the cheapest, and command most sale in Ireland. Neither are our workmen, in general, as expert as they are there, and our boots are not so well finished. The introduction of more up-to-date methods of rivetted boot-making into Ireland is desirable, solely with the object of making at home a larger portion of the vast quantity of cheap boots now worn, and is not desired or intended to displace a single workman now engaged on hand-made, “stitched,” or “pegged” boots. It is fully recognised that there is ample room for these, and that it is highly desirable to not alone continue them, but also to increase their output, if possible.

This article is written with the purpose of drawing attention to the large amount of work we provide for our neighbours which we could do for ourselves to the benefit of our own people if we only exert ourselves, and even now—although our commercial rivals in this branch of industry have got a good start ahead of us—something substantial could be done if we copy their methods.

To sum up the position, we import annually close on £2,000,000 worth of boots and shoes. If not all, we could make a very large portion of these. The materials are little, if anything, dearer in Ireland than in England.

Suppose an effort is made to produce, and in course of time results in reducing these import figures, and the country makes one million pounds worth more of boots and shoes than we do at present—there is no economic reason why we should not, it being only a question of trained labour—and suppose three pairs of boots represent £1, this would give us three million pairs of boots. Now, let a man make eight pairs per day in a working year of 300 days, and we can

see how labour may be provided for some 1,250 hands, who now seek employment in other lands. A sum approximate to £80,000 per year would be spent in wages which we now pay to shoemakers elsewhere for doing this work for us, and not alone could we find employment for this large number of men above stated, but we would also create more business for our tanneries, which naturally would be called upon to produce the class of leather required by the bootmaker, and give a much needed stimulus to other trades more or less dependent on the boot-making industry.

There is little expenditure required either on buildings or machinery. The existing buildings where the industry is now carried on are sufficient. A few cheap machines in each, with a small equipment of tools, would suffice, but a visit to study the operations elsewhere is desirable. Similar wages can be earned by Irishmen at this industry to those earned at present by Englishmen out of the Irish market, and which average from 25s. to 30s. a week.

Our advantage would be a home market, which is indisputably a sympathetic one. Our present need is the proper training of a certain number of our people in the most modern and cheapest way of rivetting a boot by hand and finishing it properly.

It is in our power to in time build up a large boot-making cottage-industry in this way, and regain for Ireland the position she has of recent years lost in this very important branch of manual art.

EGG RECORDS FOR THE YEAR 1909-10.

In the issues of the Department's JOURNAL, Vol. VIII., No. 4, and Vol. IX. Nos. 1, 3, and 4, articles appeared pointing out the need and use of egg records; and an article specially devoted to the keeping of egg records on the trap-nest system, was published in the JOURNAL, Vol. X., No. 2. Details of the results of the keeping of egg records during the year 1908-9 were published in the JOURNAL, Vol. X., No. 3, and the following article gives similar particulars of the results obtained during the year 1909-10.

In all, the appended tables give particulars of 105 flocks, but of these only 63 are complete annual records, as some of the record-keepers did not send returns throughout the whole of the period, and others of them broke up their pens, or changed their breeds during the year.

The general average for the flocks is rather more than 111 eggs per bird per year. Looking somewhat more

Some Results. closely into the returns, it is seen that one flock of birds (Andalusians) gave a result of 184 eggs per bird per annum, and this was the only flock giving more than 180 eggs for the year. In addition, one flock (White Leghorns) gave over 170 eggs per bird, three flocks gave over 160 eggs per bird, eight flocks gave over 140 eggs per bird, ten flocks gave over 120 eggs per bird, and twenty-one flocks gave over 100 eggs per bird. Thus, in all, forty-four flocks gave over 100 eggs per bird per year, and nineteen gave less than 100 eggs per bird per year. The results obtained can be seen in detail from the accompanying table:—

TABLE A.

Breed.	Average of all the flocks. *	Average of best flock.	Average of worst flock.
White Leghorns, . . .	120.7	175.6	90.1
Brown Leghorns, . . .	131.0†	141.5	117.4
Black Minorcas, . . .	123.4	94.1	90.0
Buff Orpingtons, . . .	104.2	164.3	85.9
White Orpingtons, . . .	105.5††	—	—
White Wyandottes, . . .	90.5	103.9	76.9
Faverolles, . . .	105.1	161.6	88.4
Barred Rocks, . . .	117.8	164.6	75.8
Houdans, . . .	127.8†	—	—
Sussex, . . .	83.9†	93.5	92.2
Andalusians, . . .	184.1†	—	—
Mixed Flocks, . . .	112.0	149.1	61.5
All kinds, . . .	111.1	184.1	61.5

* For the number of Birds of each Breed see Tables, pp. 87, *et seq.*

† One flock only.

† These records relate to less than 100 hens.

The above table shows some striking facts. Thus, while White Leghorns had the comparatively good average of 120.7 eggs per bird, the best flock of this breed gave 175.6 eggs per bird, and the worst flock gave 90.1 eggs per bird. Similarly, Buff Orpingtons with a moderately satisfactory return of 104.2 eggs per bird for all the flocks, had the good average of 164.3 eggs per bird for the best flock, but the low result of 85.9 eggs per bird for the poorest flock. The breeds that did well were White Leghorns, Brown Leghorns, Black Minorcas, and Barred Plymouth Rocks. The following breeds also gave satisfactory returns, but in each case the records relate to one flock only:—Andalusians had the excellent result of 184 eggs per bird per annum; Houdans had the good result of 127.8 eggs per bird per annum, and the only flock of White Orpingtons had the average of 105.5 eggs per bird per annum.

For the purposes of contrast, the general averages for 1908-9 and 1909-10 are set forth below:—

TABLE B.

Breeds	Average for the Year 1909-10.	Average for the Year 1908-9.
White Leghorns, .	120.7	128.5
Brown Leghorns, .	131.0	121.3
Black Minorcas, .	123.4	107.1
Buff Orpingtons, .	104.2	119.6
White Wyandottes, .	90.5	123.2
Faverolles, .	105.1	107.5
Plymouth Rocks, .	117.8	93.3
Mixed Flocks, .	112.0	105.7
All kinds, .	111.1	109.5

It will be seen that all the flocks taken together gave a better result during the year just ended than in 1908-9.

**Records for
1908-9 and
1909-10
Contrasted.**

There are, however, some striking variations in the results obtained by the various breeds. Thus, White Wyandottes, which had the good average of 123.2 for the year 1908-9, had the comparatively poor average of 90.5 for the year 1909-10. Again, Buff Orpingtons also showed a considerable decline in productiveness, the figures for 1909-10 being only 104.2, as contrasted with 119.6 for 1908-9. On the other hand, Black Minorcas showed an improvement, the figures for 1909-10 being 123.4, as contrasted with 107.1 for 1908-9. Mixed flocks also did better in 1909-10, the figures for this year being 112.0 as contrasted with 105.7. Indeed, one of the features of this year's return is the comparatively excellent results shown by the birds in mixed flocks, for although many of these

birds were only mongrels, the results are not distinctly inferior to those shown for the pure breeds.

**The
Importance
of Strain.**

As in previous years, the results shown in the tables bring out very closely the importance of strain, for whilst the general averages of the various breeds are not very markedly different, and, as we have pointed out above, the mixed breeds gave results little inferior to those of pure-bred fowl, there are very great variations indeed between the results shown by the best-laying strains and the worst-laying strains. This can clearly be seen in the figures in table A. A few salient facts may be pointed out. Thus, we have a flock of White Leghorns giving the high average of 175.6 eggs per bird per annum, as contrasted with another flock of birds of the same breed which yielded only 90.1 eggs per bird per annum. Similar variations are shown in other breeds. Thus, we have one flock of Buff Orpingtons with 164.3 eggs per bird per annum, and another flock which had the poor result of 85.9 eggs per bird per annum. A close examination of the returns will show many similar variations. It is not intended to claim that all the difference in results are solely due to strain, but the fact that such variations occur in all the breeds points to the conclusion that strain is the predominant cause of the wide variation.

**The Value
of Records.**

The second lesson taught by the tables is the great value of egg-laying records. For it will undoubtedly give food for thought when it is realised that a poultry-keeper may obtain an average yield of over 180 eggs per bird per year (Andalusians 184.1, White Leghorns 175.6), while another poultry-keeper gets only about one-third that number (Mixed Breeds 61.5) of eggs. These figures and others like them which occur frequently through the returns will give a poultry-keeper, whose birds are giving results below the average, much reason to look carefully into his choice of birds and his methods of keeping them.

An average of 112 eggs per annum—the general average shown for all birds in these returns—may be satisfactory up to a point, and it is undoubtedly above the general average of the country, but when results as high as those obtained by some of the more successful poultry-keepers can be attained, there is very considerable scope for improvement by the poultry-keeper whose results are up to the average. Again, those keepers of birds that have fallen very much below the average will see what a great leeway they have to make up, and they will realise the fact that they will need to improve either their birds or their methods, or perhaps both.

Again, it is not easy to estimate the average cost of a hen for a year, as conditions differ materially. For instance,

**Profit
and Loss.**

on a farm hens pick up a good deal of food, and consequently they can be fed cheaper than in cases where all their food has to be purchased. The cost of keeping hens will thus vary considerably—from very little to 5s. per hen per year, or even more. The variations of cost being so wide, it is difficult to strike an average. Probably the average hen costs, from first to last, from 3s. 6d. to 4s. per year for food. Just as the cost of keeping hens varies, so also the prices obtained for eggs differ considerably, but if the price received be taken at, say, 9d. a dozen all the year round, it will be seen that, to merely cover cost of food, a hen must lay over 60 eggs a year, and, if some slight profit and return for the care given is obtained, each hen should lay not less than 80 eggs per annum. Now, when we have in our returns a pen giving results as low as 61 eggs per annum, there is good reason to believe that there must be many flocks, or at least very many birds, giving averages below 60 eggs per hen per year, and, therefore, hens which are being kept at no profit and perhaps at a loss. These considerations will show how important it is for every poultry-keeper to carefully watch the egg production of his fowl, and the attention that must be given to the selection of egg-laying strains. Both of these facts emphasise the necessity of keeping egg records.

As will be seen from the attached tables (pp. 87-94) a considerable number of egg records are being kept in Ireland, but it is very desirable that the number should be greatly increased,

THE DEPARTMENT, THEREFORE, WISH TO KNOW OF FARMERS AND OTHER POULTRY KEEPERS WHO ARE WILLING TO KEEP EGG RECORDS. AN EGG RECORD BOOK IN WHICH RETURNS CAN BE KEPT WILL BE SENT FREE TO ALL APPLICANTS.

APPLICATIONS, WHICH NEED NOT BE STAMPED, SHOULD BE ADDRESSED TO—

THE SECRETARY,

DEPARTMENT OF AGRICULTURE AND

TECHNICAL INSTRUCTION FOR IRELAND,

UPPER MERRION STREET,

DUBLIN.

EGG-RECORDS.—YEAR 1909-10.

SUMMARY TABLE.

Name of Breed.	October.		November.		December.		January.		February.		March.		April.		May.		June.		July.		August.		September.		Total of Monthly Averages.
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
White Leghorns,	419	2.5	491	2.1	462	2.7	438	5.3	344	9.8	375	17.3	399	19.3	386	19.0	337	16.4	303	11.3	244	10.0	275	5.0	120.7
Brown Leghorns,	52	1.3	52	2.7	55	3.0	56	6.1	55	9.8	54	19.2	54	21.0	52	19.5	50	17.3	50	15.8	50	8.5	50	6.8	131.0
Black Minorcas,	151	3.3	168	1.3	161	1.3	231	6.0	232	7.7	195	18.4	135	20.4	175	22.8	144	17.3	169	14.0	121	8.0	93	2.7	123.4
Buff Orpingtons,	140	3.1	169	2.5	175	5.3	205	9.0	189	7.7	160	14.6	156	13.0	154	13.7	108	9.7	99	8.4	90	8.5	89	8.9	104.2
White Orpingtons,	30	3.0	30	3.6	25	6.2	25	9.0	32	11.4	27	15.5	28	13.5	23	10.7	25	8.8	25	4.7	25	9.0	25	10.1	105.5
White Wyandottes,	152	3.0	215	1.5	228	3.7	352	5.1	245	7.7	244	13.2	234	14.3	229	12.9	161	9.4	151	8.8	116	6.8	152	4.1	90.5
Faverolles,	215	4.2	193	2.0	264	4.6	263	6.1	257	9.0	258	15.6	258	13.7	257	13.9	187	11.0	123	8.8	119	8.1	152	8.1	105.1
Barred Plymouth Rocks,	244	5.3	284	2.7	291	4.6	292	5.5	261	7.3	292	13.8	240	15.1	246	15.1	236	13.9	187	12.5	178	13.0	230	9.0	117.8
Houdans,	25	4.6	25	5.0	25	4.2	25	9.3	25	13.7	25	21.7	25	20.0	25	17.6	24	12.0	23	6.3	23	5.5	23	7.9	127.8
Sussex,	99	2.2	99	0.5	86	2.8	107	5.0	65	8.4	83	13.2	105	9.4	82	10.8	36	8.8	36	8.0	36	8.4	36	6.4	83.9
Andalusians,	26	9.0	20	6.8	26	4.1	18	10.0	14	21.0	16	20.4	16	22.5	14	24.0	14	21.1	14	22.2	14	13.6	14	9.4	184.1
Mixed Flocks,	1813	4.6	1906	2.6	2031	3.7	1996	6.0	1991	9.5	1805	15.5	1526	16.4	1589	15.4	1514	11.8	1500	10.0	1471	8.9	1517	7.6	112.0
Totals,	3366	4.1	3652	2.4	3829	3.7	3908	5.9	3622	9.1	3501	15.5	2288	16.2	3234	14.6	2826	12.6	2680	10.9	2487	9.0	2656	7.1	111.1

WHITE LEGHORNS.

No.	October.		November.		December.		January.		February.		March.		April.		May.		June.		July.		August.		September.	
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.
1	13	4-1	10	2-6	7	5-0	20	7-2	20	12-1	22	18-3	23	20-0	23	20-3	20	13-3	20	8-3	22	8-5	22	7-9
2	28	0-0	22	1-5	21	5-6	22	4-0	17	10-3	-	-	-	-	-	-	20	16-9	20	10-0	-	-	-	-
3	30	1-1	30	1-2	30	1-6	30	3-0	30	8-2	30	17-5	30	17-6	30	17-6	20	16-9	20	10-0	-	-	-	-
4	30	0-7	30	0-0	30	0-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	43	0-0	43	8-6	43	11-6	42	11-2	40	13-7	43	14-0	40	15-1	37	16-6	33	14-9	34	12-4	20	8-7	20	0-0
6	7	0-0	7	0-0	7	0-0	7	0-0	9	11-3	7	23-6	7	26-0	7	26-0	7	27-4	7	22-3	7	18-7	20	0-0
7	30	1-5	30	3-2	35	2-2	35	6-0	30	10-4	34	15-0	33	19-4	30	20-1	30	15-3	30	10-5	30	8-0	30	3-0
8	44	6-0	44	4-6	30	5-6	30	8-4	30	10-8	30	20-0	30	25-0	28	27-1	28	22-1	28	15-4	28	10-6	28	10-0
9	30	0-6	30	0-2	30	0-3	30	1-3	30	4-9	30	10-0	30	18-4	30	19-6	36	15-5	30	12-2	30	5-5	30	1-6
10	36	7-4	36	1-0	36	0-6	33	1-7	33	10-3	33	22-2	33	24-4	33	19-6	33	18-5	43	13-0	33	13-4	33	7-9
11	8	0-0	8	3-0	8	7-0	5	13-4	5	9-6	5	18-0	5	12-8	5	14-0	5	8-6	5	2-2	5	3-2	5	11-0
12	30	0-0	50	0-0	30	0-6	30	3-8	30	9-2	30	19-3	30	17-5	30	12-0	30	12-6	30	11-3	35	4-1	30	1-2
13	40	5-6	40	3-0	39	3-5	39	7-3	-	-	-	-	34	25-6	34	22-4	31	25-4	38	10-4	34	16-7	34	7-7
14	50	3-0	50	1-0	45	0-7	46	4-4	46	7-6	45	14-7	48	15-0	43	15-1	43	10-0	18	3-6	-	-	-	-
15	-	-	35	1-0	45	1-1	45	5-0	-	-	45	15-0	40	16-6	35	18-7	-	-	18	3-6	-	-	25	6-0
16	-	-	26	0-0	25	0-0	24	0-0	24	10-7	21	23-2	21	22-0	21	21-7	21	12-5	-	-	-	-	18	2-2
Total.	419	2-5	491	2-1	462	2-7	438	5-3	344	9-8	375	17-3	399	19-3	386	19-0	337	16-4	303	11-3	244	10-0	275	5-0
																								120-7

BROWN LEGHORNS.

No.	October.		November.		December.		January.		February.		March.		April.		May.		June.		July.		August.		September.	
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.
1	22	0-0	22	0-0	25	2-6	26	4-3	25	6-7	24	18-1	24	20-9	23	18-0	20	18-0	20	14-3	20	9-0	20	5-5
2	30	2-3	30	4-6	30	3-4	30	7-6	30	12-4	30	20-0	30	21-3	29	20-5	30	16-8	30	16-8	30	8-2	30	7-6
Total.	52	1-3	52	2-7	55	3-0	56	6-1	55	9-8	54	19-2	54	21-0	52	19-5	50	17-3	50	15-8	50	8-5	50	6-8
																								131-0

MINORCAS.

No.	October.		November.		December.		January.		February.		March.		April.		May.		June.		July.		August.		September.		Total of Monthly Averages.	
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.		
1	26	11.1	45	3.0	45	3.4	45	13.3	45	25.5	45	26.0	45	25.0	45	18.6	45	12.4	45	30	7.3	30	0.0	30	1.6	90.0
2	30	0.0	30	0.0	30	8.9	30	6.4	30	15.0	30	18.0	30	14.9	30	16.9	30	7.3	30	30	17.1	10	17.1	30	6.6	-
3	14	6.6	12	3.0	10	5.9	10	5.9	14	16.0	12	21.7	12	25.1	14	19.9	14	23.3	10	30	12.6	30	6.4	30	0.1	94.1
4	40	1.7	40	1.0	40	5.1	32	14.9	32	19.0	32	20.3	30	19.6	31	18.0	30	17.8	30	30	17.8	29	7.8	29	0.1	94.1
5	35	1.0	35	0.0	32	2.6	32	2.8	32	9.4	32	15.3	32	19.0	31	18.0	30	17.8	30	30	17.8	29	7.8	29	0.1	94.1
6	6	0.0	6	2.3	4	6.0	4	8.3	4	20.3	4	7.7	4	3.5	4	16.4	4	0.0	4	4	0.0	4	0.0	4	0.0	-
7	-	-	-	-	80	7.4	75	11.7	40	18.8	40	20.1	20	18.7	20	16.4	20	17.0	18	19.5	18	19.5	-	-	-	-
Total.	151	3.3	168	1.3	161	6.0	232	7.7	195	18.4	195	20.4	175	22.8	144	17.5	169	14.0	121	8.0	93	2.7	123.4	-	-	-

BUFF ORPINGTONS.

No.	October.		November.		December.		January.		February.		March.		April.		May.		June.		July.		August.		September.		Total of Monthly Averages.
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
1	27	4.0	27	0.5	27	0.8	27	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	29	0.5	29	1.4	34	4.0	33	6.9	31	14.0	30	14.6	30	11.3	30	10.0	-	-	-	-	-	-	26	4.3	85.9
3	36	2.4	36	2.0	36	7.7	36	11.3	36	9.0	36	11.0	36	13.6	36	18.1	-	-	-	-	-	-	8	9.3	108.0
4	8	0.0	8	1.0	8	6.0	7	17.0	8	14.5	7	17.4	8	13.2	8	11.7	8	7.4	8	7.0	8	4.5	-	-	-
5	20	9.0	20	11.0	20	14.3	20	19.7	23	18.3	22	18.4	22	13.2	20	14.7	20	12.1	20	7.7	20	12.9	23	13.0	164.3
6	20	2.3	20	1.1	20	4.5	40	4.4	40	5.4	30	15.1	25	13.0	25	14.1	20	8.5	20	10.0	20	11.2	20	10.0	99.6
7	-	-	29	1.6	30	3.3	30	3.4	45	3.4	30	14.4	30	11.7	29	10.0	26	9.0	20	8.6	16	7.6	12	9.5	-
8	-	-	-	-	-	-	12	17.3	6	17.0	5	17.6	5	18.0	6	15.0	6	14.3	4	12.0	-	-	-	-	-
Total.	140	3.1	169	2.5	175	5.5	205	9.0	189	7.7	160	14.6	156	13.0	154	13.3	108	9.7	99	8.4	90	8.5	89	8.9	104.2

WHITE ORPINGTONS.

No.	October.		November.		December.		January.		February.		March.		April.		May.		June.		July.		August.		September.		Total of Monthly Averages.
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
1	30	3-0	30	3-6	25	6-2	25	9-0	32	11-4	27	15-5	28	13-5	25	10-7	25	8-8	25	4-7	25	9-0	25	10-1	105-6

WHITE WYANDOTTES.

1	25	5-0	25	3-0	24	6-1	40	4-1	40	7-7	38	15-2	36	15-7	36	13-6	28	11-6	24	12-4	40	5-8	36	3-7	103-9
2	34	3-1	45	1-4	45	1-9	43	3-9	40	6-2	40	10-6	40	13-2	40	13-7	40	7-2	40	6-5	40	7-4	40	1-8	76-9
3	18	7-1	25	3-3	25	4-6	25	8-2	25	14-5	25	14-4	19	10-7	20	6-7	20	14-0	17	4-0	17	4-0	17	4-0	96-5
4	12	2-6	12	2-8	13	5-5	12	3-7	12	14-2	13	13-0	13	11-1	12	7-7	12	7-7	12	9-8	9	15-3	9	12-2	100-2
5	36	0-0	43	1-2	43	3-1	42	5-0	41	3-6	42	5-8	40	11-0	40	7-4	22	8-0	19	12-8	—	—	21	2-8	—
6	27	2-3	23	0-4	30	3-7	39	9-5	39	12-1	39	16-4	39	15-2	37	13-6	—	—	—	—	—	—	—	—	—
7	—	—	42	0-5	40	3-0	42	4-0	49	10-7	40	17-3	36	17-6	36	15-9	36	10-6	28	8-0	—	—	21	7-9	—
8	—	—	—	—	8	6-0	8	7-5	8	5-7	8	10-0	5	16-6	5	13-0	4	12-5	8	7-0	7	5-4	8	2-7	—
Total	152	3-0	215	1-5	228	3-7	252	5-1	245	7-7	244	13-2	234	14-3	229	12-9	161	9-4	151	8-8	116	6-8	152	4-1	90-5

FAVEROLLES.

1	30	3.5	30	4.0	30	4.6	30	4.4	30	8.0	30	13.2	30	16.0	28	15.1	-	-	-	30	7.0	-
2	18	8.6	20	2.8	20	2.5	20	2.8	20	11.8	20	19.0	20	16.5	20	12.6	20	10.0	20	13.2	110.7	
3	70	2.1	35	1.0	70	4.3	69	8.4	68	6.2	68	13.5	68	11.9	68	10.5	60	10.0	-	66	-	
4	18	1.0	16	1.0	25	0.4	25	2.3	25	14.5	30	17.5	30	14.6	30	12.1	23	3.0	20	4.3	-	
5	12	8.0	30	2.4	31	3.7	30	6.2	30	8.4	30	14.2	30	14.8	35	16.4	23	3.0	20	4.7	-	
6	35	4.6	35	0.4	35	1.7	35	3.4	35	8.3	35	17.5	35	17.6	30	13.9	30	12.8	20	5.8	-	
7	16	3.3	16	4.9	16	11.1	17	8.0	12	12.7	11	18.5	12	14.7	12	15.0	11	10.7	12	10.1	-	
8	15	4.2	11	0.6	20	3.5	20	9.2	20	12.4	19	21.3	18	23.3	18	23.3	18	19.0	12	9.4	-	
9	-	-	-	-	17	5.6	17	10.0	17	7.7	15	12.4	15	12.2	16	14.3	12	14.0	4	15.2	-	
Total	215	4.2	193	2.0	264	4.6	263	6.1	257	9.0	258	15.6	258	13.7	257	13.9	187	11.0	123	8.1	105.1	

PLYMOUTH ROCKS.

[illegible]

HOLDANS.

1	25	4.6	25	5.0	25	4.2	25	9.3	25	13.7	25	21.7	25	20.0	25	17.6	24	12.0	23	6.3	23	5.5	23	7.9	127.8
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SUSSEX.

Number	October.		November.		December.		January.		February.		March.		April.		May.		June.		July.		August.		September.		Total of Monthly Averages.
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
1	20	6.0	20	1.8	20	6.8	20	8.1	20	8.2	20	13.3	20	11.1	20	10.5	20	7.7	20	6.5	20	8.1	20	5.4	93.5
2	40	0.0	40	0.0	30	0.3	38	2.9	38	8.1	38	13.4	37	10.0	32	9.1	—	—	—	—	—	—	—	—	—
3	10	1.3	10	1.7	9	1.3	8	8.3	7	10.6	7	14.1	10	9.5	10	10.0	16	10.1	16	10.0	16	8.7	16	7.6	92.2
4	29	3.0	29	0.0	27	3.0	41	5.0	—	—	18	12.4	38	8.1	20	14.4	—	—	—	—	—	—	—	—	—
Total.	99	2.2	99	0.5	86	2.8	107	5.0	65	8.4	83	13.2	105	9.4	82	10.8	36	8.8	36	8.0	36	8.4	36	6.4	83.9

ANDALUSIANS.

1	26	9.0	20	6.8	26	4.1	18	10.0	14	21.0	16	20.4	16	22.5	14	24.0	14	21.1	14	22.2	14	13.6	14	9.4	184.1
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MIXED FLOCKS.

Number.	October.		November.		December.		January.		February.		March.	
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.
1	44	2.2	64	1.7	70	1.6	70	8.5	70	11.8	66	16.0
2	42	0.0	80	0.0	80	0.4	80	5.1	80	9.7	70	16.2
3	50	6.0	60	2.8	64	6.6	73	9.0	72	11.4	-	-
4	90	5.0	84	2.2	85	3.6	84	4.4	80	13.7	80	17.1
5	36	4.6	36	4.7	42	2.3	54	3.0	54	9.0	63	12.6
6	23	2.0	25	4.7	43	1.4	46	5.0	54	10.3	44	14.1
7	44	5.7	41	3.8	41	3.3	43	2.5	35	3.2	33	9.0
8	24	3.8	24	2.6	24	2.6	24	2.5	24	3.1	24	8.7
9	75	3.3	33	3.1	45	5.5	66	5.9	67	8.7	66	14.2
10	27	1.5	30	2.0	32	3.2	30	5.4	30	6.1	-	-
11	45	1.8	45	0.3	45	3.8	45	8.2	45	16.2	45	21.0
12	55	7.0	55	3.9	55	3.4	75	4.9	75	8.8	-	-
13	56	11.4	55	6.4	45	8.0	51	8.0	66	11.1	65	17.0
14	46	6.6	40	1.1	40	0.1	40	0.3	40	1.9	75	9.1
15	34	6.4	34	2.9	32	3.4	36	7.9	36	10.4	38	13.0
16	40	9.3	30	10.1	30	8.6	30	8.4	28	7.4	25	17.7
17	50	6.7	60	4.2	60	3.7	60	7.6	60	10.7	60	18.5
18	10	16.4	15	15.8	35	7.4	35	7.5	40	12.4	40	19.8
19	30	4.0	30	4.4	30	8.7	30	11.0	35	15.5	40	17.0
20	28	2.5	29	0.0	29	0.0	29	0.5	27	6.0	40	14.7
21	21	6.3	21	1.7	20	2.9	36	5.4	35	11.2	33	17.3
22	90	3.9	90	1.9	90	3.4	90	7.4	90	11.5	90	21.9
23	80	4.8	80	2.6	80	5.8	80	6.1	60	10.7	60	15.8
24	58	5.0	158	1.0	154	1.8	-	-	-	-	-	-
25	69	2.0	66	3.0	81	5.1	63	11.2	79	8.0	80	14.5
26	35	10.4	40	3.4	60	2.5	50	7.1	50	9.3	50	18.5
27	35	2.0	35	0.0	35	1.1	35	3.9	35	8.0	35	17.0
28	70	1.4	75	0.0	70	0.6	75	4.2	70	10.5	70	17.6
29	54	4.1	54	2.9	52	2.3	61	4.3	53	12.1	52	14.0
30	60	7.9	-	-	-	-	80	8.0	70	13.5	70	21.3
31	40	5.1	39	3.2	39	4.5	39	9.3	52	11.2	52	17.4
32	82	1.3	90	0.5	90	0.0	84	0.6	85	3.0	83	10.2
33	12	1.7	12	0.0	23	1.0	23	2.7	18	5.7	22	7.5
34	40	2.2	-	-	40	0.7	40	2.8	41	4.8	40	8.9
35	28	7.4	30	7.4	30	4.0	-	-	-	-	-	-
36	70	3.5	100	1.2	100	1.7	100	4.8	100	6.0	100	14.8
37	45	1.3	45	1.0	32	2.0	32	5.2	32	8.7	32	13.0
38	35	4.0	35	4.2	31	17.0	28	21.0	22	17.5	22	15.7
39	40	3.8	66	2.0	77	7.7	79	7.3	81	7.5	40	12.3
Total, .	1813	4.6	1906	2.6	2031	3.7	1996	6.0	1991	9.5	1805	15.5

MIXED FLOCKS.

	April.		May.		June.		July.		August.		September.						
Number of Hens.	Average Number of Eggs laid per Hen.		Number of Hens.	Average Number of Eggs laid per Hen.		Number of Hens	Average Number of Eggs laid per Hen		Number of Hens.	Average Number of Eggs laid per Hen.		Number of Hens	Average Number of Eggs laid per Hen.		Total of Monthly Averages.		
60	19.1		60	20.8		60	17.8		60	16.3		66	13.4		40	11.4	140.6
60	18.4		50	20.9		40	14.8		—	—		—	—		—	—	—
60	18.4		56	24.2		—	—		50	13.3		45	9.5		42	8.7	—
—	—		70	15.2		—	—		60	9.9		70	7.0		70	11.2	—
63	12.7		62	13.5		55	12.5		55	12.1		48	13.3		48	6.4	106.7
40	15.3		40	19.6		40	14.4		35	7.0		43	4.1		30	6.7	104.6
34	9.6		35	9.5		25	13.6		31	3.9		35	8.6		39	5.3	78.0
24	11.9		24	5.2		24	5.4		24	1.2		22	8.6		24	6.0	61.5
66	12.6		65	13.2		64	11.5		62	12.1		60	9.1		64	7.9	107.1
—	—		—	—		—	—		—	—		—	—		—	—	—
45	20.1		45	10.0		45	7.6		45	9.0		45	4.3		45	4.0	106.2
—	—		—	—		—	—		—	—		—	—		—	—	—
60	18.2		45	18.4		40	13.5		35	10.7		35	10.7		40	13.8	147.2
—	—		70	10.1		70	5.5		69	3.3		60	3.4		60	4.7	—
38	11.1		39	7.3		33	8.0		23	10.1		21	10.5		23	13.0	104.0
25	18.0		30	13.6		25	12.7		44	7.0		40	12.4		45	6.5	131.7
55	19.5		45	18.4		45	16.9		40	19.3		55	14.4		45	8.6	148.5
40	14.5		35	12.6		40	14.6		40	8.7		40	4.9		30	10.3	144.9
—	—		67	8.5		67	6.3		77	7.7		77	8.0		77	4.4	—
34	13.0		37	12.4		35	7.3		30	3.0		—	—		37	6.5	—
30	17.7		29	17.0		26	13.2		24	13.6		21	10.9		21	3.5	120.7
90	26.7		90	26.1		90	17.0		90	9.3		90	6.6		90	13.4	149.1
80	16.0		—	—		80	14.2		—	—		—	—		—	—	—
—	—		—	—		—	—		—	—		—	—		—	—	—
72	13.6		72	12.0		67	11.4		66	9.0		60	9.1		89	5.0	103.9
43	18.0		40	17.2		39	14.5		30	14.1		30	13.0		50	5.3	133.3
35	17.0		35	14.8		35	13.0		35	7.7		35	6.2		35	5.5	96.2
70	13.4		20	19.2		30	11.5		20	17.1		20	13.1		20	12.8	121.4
49	15.9		48	16.1		48	12.8		47	10.5		46	11.4		46	9.0	115.4
—	—		—	—		70	9.4		62	9.0		62	9.0		78	7.0	—
49	15.9		48	16.6		40	12.2		40	14.1		38	11.8		38	7.6	128.9
75	14.0		79	17.0		76	13.5		70	12.8		60	9.5		60	7.0	89.4
—	—		—	—		—	—		—	—		—	—		—	—	—
38	16.4		38	17.6		—	—		38	14.3		41	11.6		42	5.0	—
—	—		—	—		—	—		—	—		—	—		—	—	—
100	14.3		100	14.0		100	9.7		100	9.8		100	7.3		104	6.0	92.3
32	12.0		32	11.0		46	6.9		41	3.0		46	1.9		32	4.1	70.1
19	22.5		18	19.0		—	—		—	—		—	—		—	—	—
40	13.4		65	15.2		59	14.0		57	11.9		60	10.7		53	10.3	116.1
1526	16.4	1,589	15.4	1,514	11.8	1,500	10.0	1,471	8.9	1,517	7.6	112.0					

EARLY POTATO GROWING.

The season for this crop in Ireland proved favourable, and the results upon the whole satisfactory. There was a propitious seeding time, an absence of spring frost, and sufficient moisture. The crops, therefore, had no back-sets, but made continuous growth throughout. I made my inspection during the first week in June in company with the Vice-President, and we found in many of the districts crops which could not be excelled in any country. Similar conditions, however, obtained on the other side of the Channel, and English and Scotch crops pressed very closely on the Irish, so that only a very short period of high prices was possible. As will be seen from the reports, the growers who were first in the market obtained the best results.

Commencing with Co. Dublin, the Gardens at Rush presented a magnificent appearance. The growers in that **Dublin District.** District do not attempt cross-Channel exportation, but confine themselves to Dublin Market, and, consequently, not a very large proportion of the first early varieties are grown. They are all fully alive however to the advantages of boxing, and one rarely sees now the patchy and irregular crops which were common ten years ago. In the neighbourhood of Malahide and Skerries there are large acreages under field culture. It is not possible to get any accurate details of the results of these, but one large grower has, as before, been kind enough to send a statement regarding his returns. They are as follows—

“ 16½ acres yielded—

63 t.	8 cwt.	Large.
12 t.	9 cwt.	Seconds.
4 t.	0 cwt.	Seed.

Total 79 t. 17 cwt.

	£	s.	d.
Realised, after paying commission	...	523	0 0
Deduct—			
Railway freight	...	£47	14 0
Cartage to railway	...	£12	0 0
		-----	59 14 0
		-----	£463 6 0

"Varieties.—Epicure, Ninetyfold, Midlothian Early, and British Queen.

Epicures raised on 10th June.

Ninetyfold, heaviest cropper.

Midlothian Early, very bad cropper.

Yield this year, one ton per acre less than in 1909.

SECOND CROP.

"3½ acres potatoes (Champion II. and Shamrock) planted 18th June. This crop promises well and is not diseased.

The following have also been planted on the grounds, viz.—

1 acre broccoli, very good; 5 acres of turnips, very good; 5 acres of savoy cabbage, also very good; 1 acre of winter vetches, and the remaining 1½ acres have not been planted.

The season was a very favourable one for these crops."

At Kilmore in Co. Wexford, the growers have formed themselves

Co. into a Co-operative Society, and the following is

Wexford. the Report of Mr. James Murphy, the Secretary:—

"I beg to forward you the enclosed statistics from the Kilmore Early Potato Growers' Society, for the season 1910, which the members have furnished me.

"You will perceive therefrom that, with the exception of a few lots, the produce was disposed of in Liverpool; the first parcel was put on the market there on the 27th June and the last towards the middle of July, and the price per cwt. fluctuated meanwhile from 6s. 6d. to 3s. 9d.

"The experimenters feel that if the crop could be got to mature, say a fortnight earlier, there would be every encouragement to increase the acreage because the price would then repay for the outlay and the care essential for the successful raising of First Earlies and also in view of the better chance of having a catch (or 'stolen') crop after the potatoes had been got out of the land.

"I regret to have to point out this again, that the charges from Liverpool wharf to the places of marketing are still extremely high for cartage. Cost of 'carriage and cartage' are combined under one head, but from quotations the railway and water rates are fairly reasonable, and with which the Society have little grounds for complaint. But the freight on the potatoes from the steamer at Liverpool to the market seems altogether excessive, more especially when compared with any like expenses incurred at this end. The Society hopes that something will be done to considerably reduce the present rates there for cartage. With the commission, freight on empties, portorage and other incidental expenses there is no reason to complain.

" With a couple of exceptions the growers find that the season just terminated has proved satisfactory, at least, and were it not for the almost continuous cold, harsh winds in the middle stages of the growth of the crop, perhaps this year would have been the most successful on record, as it escaped the April and May frosts which played such havoc in years heretofore.

" The variety sown was 'Ninetyfold' with the addition of a few small lots of 'Epicures' for seeding purposes and the catch crop either turnips or cabbage.

" JAMES MURPHY, *Secretary.*"

DETAILS—KILMORE.

Name of Grower.	Acreage	Markets in which produce sold.	Net return per Statute Acre.
	A. R.		£ s. d.
Mr. J. Furlong,	1 1	Liverpool,	15 2 6
R. Winters,	0 3	Do.,	13 15 0
W. Stafford,	1 0	Do.,	19 0 2
T. Marshall,	1 0	Do.,	20 10 1
W. Harpur,	1 1	Do.,	14 3 8
J. Murphy,	0 3	Do., and Wexford,	14 11 5
R. F. Grant	0 3	Do., and locally,	13 10 0
J. Rochford,	0 1	Do.,	12 1 8
P. Rossiter,	0 3	Do.,	6 17 9
J. Barry,	0 3	Do., and Wexford,	13 18 4
L. H. Taylor,	0 1	Do., and „	27 0 0
Wm. Stafford,	1 0	Do., and „	9 6 8
P. Codd,	0 3	Do., and Dublin,	14 17 4
P. Byrne,	2 0	Do.,	18 18 11
P. Furlong,	0 1	Wexford,	12 8 0

In each case the net return per statute acre includes the value of the produce kept for seed.

I am bound to say that this District was somewhat disappointing. The results are not as good as they might have been, and I am unable to find any good reason for it. The conditions appear to me to be ideal; soft warm soil, well sheltered fields, and the ameliorating influence of the sea all around. Transit facilities, too, are the best in the South of Ireland with a bi-weekly service to Liverpool from Wexford, and the same to Liverpool and Glasgow from Waterford. There is also a daily service *via* Rosslare to the Bristol Channel and the English Midlands. With all these advantages it appears to me that this district might do better.

In Co. Waterford the industry has scarcely as yet passed beyond the experimental stage, and growers are still under the direct supervision of the Department's Overseer. Here we found the best crops, which, as the following returns show, produced the best results:—

TRAMORE.

Mr. P. Power— $\frac{1}{2}$ acre—Produce sold in Glasgow and Liverpool. Net return per statute acre = £20 5s. 0d.

Mr. N. Phelan— $\frac{1}{2}$ acre—Produce sold in Glasgow. Net return per statute acre = £23 13s. 2d.

Mr. T. O'Brien— $\frac{1}{2}$ acre—Produce sold locally. Net return per statute acre = £30 19s. 8d.

Mr. J. Spencer— $\frac{1}{4}$ acre—Produce sold locally. Net return per statute acre = £25 0s. 0d.

Mr. P. Noonan— $\frac{1}{4}$ acre—Produce sold locally. Net return per statute acre = £23 16s. 0d.

Mr. T. Keohan— $\frac{1}{4}$ acre—Produce sold locally. Net return per statute acre = £36 14s. 0d.

Mr. J. Keohan— $\frac{1}{4}$ acre—Produce sold locally. Net return per statute acre = £29 3s. 4d.

DUNMORE.

Mr. J. T. Shipsey— $\frac{3}{4}$ acre—Produce sold locally. Net return per statute acre = £32 4s. 0d.

Mr. P. Harney— $\frac{1}{2}$ acre—Estimated value of crop per statute acre = £20 0s. 0d.

Mr. P. O'Toole— $\frac{1}{2}$ acre—Produce sold locally. Net return per statute acre = £16 4s. 10d.

BONMAHON.

Mr. N. Fitzgerald— $\frac{1}{2}$ acre—Produce sold in Liverpool. Net return per statute acre = £22 1s. 10d.

Mr. R. J. Watts— $\frac{1}{2}$ acre—Produce sold in Liverpool. Net return per statute acre = £23 1s. 0d.

DUNGARVAN.

Mr. P. Sheridan— $\frac{1}{2}$ acre—Produce sold in Liverpool and locally. Net return per statute acre = £26 0s. 4d.

Mr. P. Kelly— $\frac{1}{4}$ acre—Produce sold in Liverpool. Net return per statute acre = £25 14s. 4d.

Mr. N. Hayes— $\frac{1}{2}$ acre—Produce sold in Liverpool. Net return per statute acre = £22 9s. 2d.

Mr. M. Veale— $\frac{1}{4}$ acre—Produce sold in Liverpool. Net return per statute acre = £32 1s. 8d.

Mr. Wm. Treacy— $\frac{1}{4}$ acre—Produce sold in Liverpool. Net return per statute acre = £19 10s. 8d.

Mrs. Terry— $\frac{1}{2}$ acre—Produce sold in Liverpool. Net return per statute acre = £19 15s. 10d.

Mr. P. Power— $\frac{1}{4}$ acre—Produce sold in Liverpool. Net return per statute acre = £19 6s. 8d.

Mr. Wm. Hayes— $\frac{1}{2}$ acre—Produce sold in Liverpool. Net return per statute acre = £26 16s. 4d.

Mr. P. Cahill— $\frac{1}{4}$ acre—Produce sold in Liverpool. Net return per statute acre = £16 5s. 8d.

Mr. R. Hanrahan— $\frac{1}{4}$ acre—Produce sold in Liverpool. Net return per statute acre = £20 16s. 0d.

Mr. P. Treacy— $\frac{1}{4}$ acre—Produce sold in Liverpool and locally. Net return per statute acre = £48 13s. 8d.

Mr. P. Daniels— $\frac{1}{2}$ acre—Produce sold in Liverpool and locally. Net return per statute acre = £34 14s. 2d.

Mr. J. Greene— $\frac{1}{2}$ acre—Produce sold in Liverpool and locally. Net return per statute acre = £16 7s. 10d.

Mr. D. Dempsey— $\frac{1}{2}$ acre—Produce sold in Liverpool. Net return per statute acre = £27 9s. 4d.

It is impossible to speak too highly of the general excellence of the crops in these districts, and of the care and attention bestowed upon them by the growers. The greatest number are in the neighbourhood of Dungarvan, and these have now formed themselves into a Co-operative Society for the purposes of buying seed and manure, and also for marketing, with Mr. P. Sheridan as secretary.

At Youghal, in Co Cork, there were the usual number of growers, the greater number of whom form the Gortroe Co-operative Society. The following Report and Statement, which have been received from the

**Youghal
District.**

Rev. Michael Aherne, C.C., give the result of their operations:—

“REPORT ON THE EARLY POTATO CROP IN THE YOUGHAL DISTRICT.

“I beg to hand you herewith a table giving particulars of the early potato crop, grown in the Youghal district and marketed by the Local Agricultural Co-operative Society. It comprised roundly eight and a half acres. About two additional acres were cultivated by non-society growers. As to the yield and return from these I possess no reliable information.

“The total crop was the smallest raised in this centre since the introduction of the industry. The shrinkage was evidently due partly to the low prices obtained last year and the year before, and partly to the discontinuance of the Department’s seed grant. It is, however, gratifying to be able to record that, although thrown for the first time exclusively on their own resources, the growers received a higher average price—£22 8s. 5d. an acre net—this season than in any season previously. As a result, a very considerable increase may be expected in next year’s crop.

“The plots completely escaped the frost. But owing to cold and wet weather in May, lifting did not begin until June 16th—fully a week later than last year. Most of the crop was sold in the home

markets, and netted an average price of almost £4 per ton. The first consignments were marketed in Glasgow, but although the opening price there was very good and the demand very brisk, the majority of the growers hesitated to dig out extensively, being desirous of securing a heavier yield. A glance at the accompanying table will show what a grave error of judgment they made, and before the season had closed they fully realised and admitted it themselves.

“ The home market would have given a better return were it not for a rise in the railway goods rate charged us of about 40% over that we had to pay in 1908 and 1909. The increase was paid under protest, and an explanation asked for, but none was given.

“ This year saw a considerable improvement in the number of orders received by post and wire from the principal towns of the County. To execute several of these, the railway passenger service had to be availed of. And here again the rate hampers and blocks development. Orders coming from Glasgow can be forwarded at a rate of 25s. a ton, which covers passenger service to Dublin, and steamer thence to destination. But if an order arrives from Cork, it cannot be executed by passenger train unless at a rate of 15s. a ton; and if it comes from Mallow, 20s. a ton; and if from Charleville, 30s. a ton.

“ (REV.) MICHAEL AHERNE, C.C.”

Date Lifted.	Grower.	Area.	Yield.	Nett sum paid Growers.	Value of seed retained at £3 per ton.	Total Value of Crop.	Approximate Return per acre nett.	Markets.	Estimated Value of Second Crop.
		A. B.	P. Ton Cwt. Qr	£ s. d.	£ s. d.	£ s. d.	£ s. d.		£ s. d.
June 16	D. Gleeson, .	2 0	1 17 2	8 19 5½	1 10 0	10 9 5½	20 18 11	Glasgow & Home	6 0 0
" 17	Mat. Glavin, Pilmore	2 0	2 0 2	8 16 0	1 4 0	10 0 0	20 0 0	"	6 0 0
" 18	ML. Gleeson .	2 0	2 5 0	13 12 9	1 10 0	15 2 9	30 5 6	Glasgow .	8 0 0
" 20	Moe. Kirk .	1 0	1 13 0	9 5 4	0 12 0	9 17 4	39 9 4	"	2 10 0
" 20	Jas. Griffin .	2 20	2 14 0	13 5 5	1 4 0	14 9 5	25 6 6	Glasgow & Home	10 0 0
" 21	P. Glavin .	0 20	0 19 2	5 8 4½	—	5 8 4½	43 7 0	Glasgow	1 10 0
" 21	John Coleman .	2 20	4 14 2	19 9 3	1 4 0	20 13 3	36 3 3	Glasgow & Home	5 0 0
" 22	Pat Quirke .	1 0	0 19 2	4 7 4½	—	4 7 4½	17 9 6	Glasgow	3 0 0
" 22	Wm. Cashman .	3 0	2 12 2	9 9 2½	—	9 9 2½	11 16 6	Glasgow & Home	1 0 0
" 23	Ned Scully .	1 30	2 18 2	11 12 7	—	11 12 7	26 11 9	"	5 0 0
" 24	John Griffin, Kennel	1 0	1 10 0	5 11 5	0 12 0	6 3 5	25 13 8	Home.	6 0 0
" 26	P. Dea .	3 0	2 2 0	7 16 0	1 10 0	9 6 0	11 12 6	"	4 0 0
" 28	Mat Glavin, Creemore	1 0	0 19 2	3 12 5	0 13 9	4 7 5	17 9 8	"	2 10 0
" 30	J. Cashman, .	3 0	2 14 2	10 3 9	1 10 0	11 13 9	14 12 5	"	10 0 0
July 1	ML. Cronin .	2 0	1 19 0	7 4 10	1 4 0	8 8 10	16 17 8	"	5 0 0
" 4	Mrs. O'Brien .	1 0	0 16 2	3 1 3	0 12 0	3 13 3	14 13 0	"	3 0 0
" 7	R. Motherway .	2 0	1 4 0	4 9 1	—	4 9 1	8 18 2	"	2 0 0
" 7	Dan Flavin .	1 20	2 3 2	8 1 7	—	8 1 7	28 9 7	"	1 0 0
" 8	R. Forest .	1 0	1 2 2	4 3 6	—	4 3 6	16 14 0	"	1 0 0
Totals		8 1 30	37 6 0	158 9 7	13 7 0	171 16 7	General average net per acre £22 8 5		82 10 0

The Catch Crops following the potatoes consist of turnips, broccoli, cauliflowers and cabbages.

The crops of this district on the whole were very good, though varying to an extent which I thought unnecessary. Under conditions almost identical, there ought not to be strong crops and weak crops alongside each other. In this district, indeed in all the districts, but especially at Gortroe, greater attention is being paid to the possibilities of the second crop. Hitherto growers have been content to take a turnip crop, which no doubt paid them extremely well, but now they are showing a most commendable enterprise in the direction of market garden produce. I have all along held the opinion that there is great room for development in this direction in the South of Ireland, and I think it is a subject to which the Department might very well devote some attention, and foster an industry in young vegetables for late autumn and winter use for which there is an enormous demand in England.

From Clonakilty there is only one Report sent from the Agricultural Station as follows:—

“ AGRICULTURAL STATION, CLONAKILTY.

“ Area about 1 acre.

Ninetyfolds were lifted on 13th and 15th June.

Epicures „ „ 20th June.

All sold in Glasgow market.

	£	s.	d.
First lot of Ninetyfolds made	... 10	13	4
Second „ „	... 10	0	0
Epicures made	... 8	0	0
Nett return per acre	... 32	0	0

“Ninetyfolds were home-grown seed, boxed in July; Epicures were purchased in Glasgow, and not boxed till end of January.

In Co. Sligo, the quality of the crops and results may be judged from the Report which Mr. J. A. Cooper, on behalf of Sir Josslyn Gore-Booth, has been kind enough, as usual, to send in:—

Sligo District.

“ As requested, I have pleasure in sending you particulars of the early potato crop grown here this season, together with a few notes on same, and a comparison of this year's figures with those for previous years. Taking it all round, it has been a fair average year. Whilst we have had blight on some of our earlies this year which we have never had before, we have had no set-back by reason of frost, and our average yield per statute acre has been well above the average.

"We started digging this year on June 15th, as against June 7th in 1909, and June 22nd in 1908. For the first time in our experience 'Epicure' was earliest ready, beating 'Ninetyfold,' which, up to this, has always proved itself to be (with us) the best early potato both for earliness and yield. Its yield is still the highest, and higher than last year, probably owing to its being dug later.

"As mentioned, some of our crop was struck by blight this year, principally 'Ninetyfold' and 'Epicure.' We have had 9 tons of bad potatoes (which of course are not included in the figures underneath), and these were practically all 'Ninetyfold,' as although 'Epicures' were equally badly struck, they dug out free from bad potatoes. 'Duke of York' has consistently proved such a small cropper with us that we are discarding it to try 'Midlothian Early.' The following shows the details of this year's crop:—

Variety.	Area Statute.			When Planted.	When Lifted.	Yield.	Average yield per Statute Acre.		
	A.	R.	P.			T. C. Q.	T. C. Q.		
Epicure, . . .	2	3	0	21 March .	15 June to 22 July.	14 12 1	5	6	1
Ninetyfold, . .	6	3	3	22-29 „ .	23 June to 25 July.	49 14 1	7	6	3
Duke of York, .	0	3	6	25 „ .	17 June .	1 16 0	2	5	0
May Queen, . .	0	3	27	25 „ .	25 „ .	3 8 1	3	14	2
Midlothian Early	0	2	0	30 „ .	23 July. .	2 5 0	4	10	0
	11	2	36			71 15 3			

"All the above were sold with the exception of 12 tons 10 cwt. (mostly 'Epicure'), which we retained for seed for our own use, and which, valued at £4 per ton same as in previous years, we have included in the total of our gross receipts.

"Our marketing expenses this year were £40 10s. 6d., as against £47 4s. 6d. in 1909, and £19 0s. 9d. in 1908. These marketing expenses include freights outwards and on returned empties, portage, commission, etc., but they do not of course include any proportion of the cost of tillage.

"We started growing early potatoes here in 1903 under the Department's guidance, and it may be of interest to compare the results of each year's growing since then, as shown in the following table:—

Year.	Com- menced digging on	Total area for sale Statute.	Yield.	Gross receipts.	Average received per ton (gross).	Average return per statute acre (gross)	Average yield per statute acre.
		A. R. P.	T. C. Q. Lb.	£ s. d.	£ s. d.	£ s. d.	T. C. Q.
1903	June 9	2 3 39	15 12 1 21	159 14 4	10 0 0	53 0 0	5 4 0
1904	" 7	4 3 5	22 3 1 0	181 15 1	8 4 0	38 0 0	4 12 0
1905	" 13	5 2 20	34 18 2 7	230 11 5	6 12 0	41 0 0	6 4 0
1906	" 23	4 2 41	21 17 3 21	148 10 4	6 15 0	30 0 0	4 14 0
1907	" 11	15 0 12	55 11 0 0	364 12 0	6 11 3	26 0 0	4 5 0
1908	" 22	10 3 0	62 2 2 0	264 1 5	4 5 0	24 11 3	5 15 2
1909	" 7	11 0 36	49 5 2 0	309 12 4	6 5 8	27 11 7	4 7 3
1910	" 15	11 2 36	71 15 3 0	326 8 0	4 11 0	27 13 4	6 2 1

"The above table includes whatever potatoes were kept for seed each year, taken at £4 per ton.

"In considering the above results, it should be borne in mind that as we dug the early potatoes, we planted turnips, cabbage, rape, rye and Italian ryegrass, some of which gave excellent crops, and the fact of having two crops in one season must of course be taken into consideration.

"In previous years, I referred to the marketing of the crop as being the weak spot in early potato growing in this district. I do not wish to unduly press the point, but I think it is a pity to see the excellent work done in the past by your Department in the way of starting this early potato growing gradually fizzling out amongst the farmers in this district. The climate is right, there is plenty of soil more suitable than Lissadell, the farmers know (thanks to the Department) how to grow them, but when they have the crop ready they don't know what to do with it. A little help—either through the Department or by co-operation—would, I think, set this right.

"J. A. COOPER,

"Agent for Sir Josslyn Gore-Booth, Bart."

There is nothing new to suggest as regards the varieties of potatoes to be used for this purpose. "Ninetyfold" and "Epicure" appear to be quite satisfactory, and had better be adhered to for the present. The tillage at all the districts was good, and the plots clean and well cared for. On some I think more farmyard manure might usefully be applied, and growers are reminded that upon such applications the success of the second crops also depends. This is an important point to consider when some of the growers estimate the value of their second crop as high as £10 per acre.

M. G. WALLACE.

CROP REPORT, No. 4—MID-OCTOBER, 1910.

The sorely needed spell of dry harvest weather which set in about the beginning of September and continued uninterruptedly until the close of the month, brought much relief to a situation which was rapidly becoming serious. Harvesting which began in the earlier districts of the southern and midland areas about the middle of August was greatly delayed by the continuous rain; much of the earlier cereal crops, already over-ripe, were being beaten down, with consequent damage to the grain; while in the case of fields in which cutting had been proceeded with, a similar injury to the crop was also taking place. Happily, the change to drier conditions, which began with the opening days of September, checked any further loss, and from this period onwards the cutting and saving of the cereal crops all over the country was effected under the most advantageous circumstances. During the whole month of September only the fractional amount of .7 inches fell, and the weather throughout kept warm and summerlike. Thus, the main harvest period, with the exception of the last fortnight of August, is admitted to have been one of the best on record, and over most of the northern and western area, by far the larger area of the cereal crops, was cut down, saved, and carted without being exposed to any rain whatever. Other crops, such as potatoes, mangels, turnips, and even pasture were also much benefited by the prolonged warmth which served largely to minimize the serious injury caused by the continuous rains and low temperature during August. The chief facts elicited regarding each of the crops from the series of reports received at mid-October are:—

In the case of both wheat, oats, and barley, the lack of heat and sunshine during the later stages of the ripening period has been the cause of reducing the yield of grain obtained. The complaint is general that none of these cereals filled as satisfactorily as in other years, and there is, consequently, a lack of plumpness noticeable in most of the samples. Owing to the character of the season, wheat is generally referred to as soft and, in some cases, discoloured. The same is true as regards both oats and barley, and, except where cutting was delayed till after September 1st, the sample is not equal in quality to that of last year. Unfortunately for growers, prices for all three cereals are considerably under last year's rates, and this, together with the decreased yield, has served to make the cultivation of these crops less profitable than usual. Owing to the fine weather after cutting and saving, an abundance

of good quality oat straw has the year been obtained, which will serve to compensate for the inferiority in feeding quality of most of the season's hay crop.

Reports regarding the potato crop show that things are not so serious as might at one time have been anticipated.

The Potato Crop.

It is generally agreed that the yield will be much below that obtained last year, while the quality is also deficient; there is an unusually high proportion of small and diseased tubers reported, more especially in counties which are low-lying and liable to flooding; on the other hand, reports from County Antrim and Down disclose that yields will be average, and that there is not much disease noticeable in the crop. The old champion variety, it is stated, has shown more proclivity to disease than any other, and the loss where this variety is still more widely grown appears to be greatest. Raising of the crop has become general since the first of October, and this has been favoured with most suitable weather.

The lack of heat and sunshine in August proved disastrous to the chance of a full crop of roots, and hence both

The Root Crops.

mangels and turnips, except on very favourable soils, are acknowledged to be much below last year's yield. The extreme dampness of the season also encouraged an abnormal growth of weeds which proved unfavourable to the healthy development of the crops.

Not much of the flax crop has yet been cleaned. Reports regarding the first scutched lots show a variability in

Flax.

yields, but it is expected that an average return will be obtained. Markets have opened most satisfactorily and prices are considerably above the corresponding rates last year. The crop is stated to be likely to prove the most profitable of those which the Ulster farmer has grown this year, and if so, is likely to be followed by a further extension of the area devoted to it next season.

Subjoined are summaries of the reports received from the several correspondents in each of the different counties:—

Leinster.

Wheat did not yield well—four to five barrels less per Irish acre than last year; markets opened at £1 per barrel

Co. Carlow.

(20 stones); now selling at 17s.; the grain bushelled light. The oat crop in some cases gave an average yield of grain, but, as a rule, below last year's return; a heavy bulk of straw obtained; prices are poor—from 8s. to 8s. 6d. per barrel (14 stones). Barley shows a soft sample, and the yield

is short of last year; the price opened at 14s. per barrel (16 stones), but has come back to 13s. 6d. Potatoes mostly a poor crop, especially champions; a great proportion small and diseased; Up-to-Dates have given the best return. Mangels a fair crop, but very weedy. Turnips have made a good growth, but as a rule very deficient in yield; early-sown fields have invariably done best. Pasture looks fresh and green; cattle are still thriving well; prices have dropped recently about 10s. per head. Sheep a dragging trade, though breeding ewes are fetching 5s. to 7s. above last year's prices. Bacon pigs are fetching good prices; present market value 60s. per cwt.

Wheat has given a 10% lower yield than last year; prices are also 2s. 6d. to 3s. lower per barrel. Oats have been

Co. Dublin. nearly all threshed, and did not come up to last year's yield; prices, too, have dropped correspondingly with wheat. Barley showed a shrinkage of nearly one-fourth from last year's yield, the grain of all the cereals has been in general small. Potatoes have not dug out half an ordinary crop; quality inferior, many small and diseased. Mangels doing well, but will not be up to average, owing to lack of sunshine during the summer. Turnips also improving, but will be a short crop. Pasture exceptionally good; cattle improving.

Wheat nearly all threshed; yield disappointing, grain shrivelled and soft in condition, with a high proportion of

Co. Kildare. tailings; the average may be about 14 barrels per Irish acre, compared with 20 barrels last year; prices low—from 16s. 6d. to 17s. 6d. Oats have not threshed out well; much of the grain cut in August sprouted and gave a poor, soft sample; price, 8s. 6d. per barrel for black oats. Barley has given a disappointing yield, and prices unsatisfactory; average might be about 11 to 12 barrels per Irish acre; few growers realized the top price of 11s. Rye was well saved, but yields deficient. Potatoes are small in size, with a large proportion black; fully one-third below last year; especially poor where unsprayed. Mangels not nearly so good as last year; kept back by the cold rains of August. Turnips are an equally poor crop; have shown some improvement since September. Pasture good and well covered. Cattle have gone back in price, though stores are still selling well. Poor trade in fat sheep; store sheep, however, meeting a brisk demand.

Wheat only a fair return; price low, from 17s. to 17s. 9d. per barrel; good bulk of straw. A considerable

Co. Kilkenny. amount of loss in oats from lodging and subsequent sprouting; yield under last year; prices low and demand poor. Return from barley below average; sample deficient

in quality; prices from 13s. to 14s. per barrel. The potato crop has now been lifted for the most part; reports variable; where unsprayed about thirty per cent. of the crop are diseased; Champions show the greatest deficiency. Mangels hardly average, though some fields are good and still growing. Turnips are improving; may be a fair crop; still must be under average. Pasture at present good and carrying plenty of fresh growth. Cattle much improved since the beginning of September. Forward stores are fetching a fair price at present. Milch cows are beginning to show a falling off in milk, though quality is well maintained. Pigs still selling well, though there was a recent drop to 56s. per cwt.

Wheat mostly threshed; sample pretty good, with a fair average yield. The oat crop was all secured in good condition; a fair proportion threshed; sample varies very much; early sowings mostly superior to late sowings; grain not very well filled. Barley is yielding about one-fourth less than last year—about 12 barrels per Irish acre; sample poor. Potatoes are digging out under average; a great many diseased in places; have improved much in quality during the late dry weather. Mangels hardly average, due to the cold summer. Turnips very variable; some good fields; early sowings suffered much from an attack of green fly. Cabbage good. Rape also looks well. Pasture very good and holding out well. Forward conditioned stores commanding a good price.

Wheat not much grown; cut and stacked in good weather; promises a fair yield. The oat crop was splendidly saved; not much threshed yet; plenty of straw, but grain not bulking satisfactorily; it filled badly and suffered much damage during August. Potatoes very bad where not sprayed; may be average where sprayed; a great many are blackened; tubers as a rule are soft, except on very sandy land; not many dug yet; are likely to be scarce and dear in the spring time; at present fetching 4s. to 4s. 6d. per cwt. locally. Mangels and turnips have done well during the past month; the crop, however, is light, except on dry soils where the yield is fairly good; likely to be a quarter under average. Cabbage little grown; crop excellent. An abundant supply of grass on pastures; hardened well during the late dry weather. Store cattle selling well; beef a little down in price, though still dear for the season. Sheep now in brisk demand; prices from 8s. to 10s. over last year; lambs are also selling 6s. to 8s. in advance. Young pigs dear; fetching 26s. to 31s. each. Fat pigs a little down.

A good yield of wheat straw; grain deficient in return—about 8½ barrels per statute acre; nearly all threshed.

Co. Louth. Oats in general a poor yield—about 9 barrels per statute acre; prices low; nearly all threshed.

Barley has given an under-average return; the cold spring was against it; yield may be about 10½ barrels per statute acre. Potatoes much diseased and a small crop; about one-third of the crop has been lifted; return considerably below last year. Mangels not good, and will be deficient in yield. Turnips not uniform; very light in places; certain to be under-average; suffered in some districts from “cabbage-head,” and also from leaf-blotch attack. Pasture holding out well owing to the dry weather. Beef cattle not selling so well recently; milch cows dear.

Wheat a good crop, especially the winter sown; none threshed yet; was well saved. Oats under-average; some

Co. Meath. bad samples owing to the broken August; late sowings are not threshing out well owing to lack of sunshine for ripening; yield in general 20 to 25% under last year; grain small and rough but in good condition and colour. Barley little sown; variable in return. Rye not sown much except in a few boggy patches; the crop turned out good and has been cut and stacked. Potatoes are rather variable, but in all cases under-average as much as 25%, even on dry land and sprayed; quality of tubers poor; very few satisfactory yields obtained. Mangels generally very uneven and considerably under-average; weeds more plentiful than usual. Turnips improved well of late, but yield will be light; may be average on dry land, but on wet, low-lying soils a failure. Cabbage late but promises well; are now of much service as cattle feeding. Pasture abundant but quality not so good as usual. Store cattle and sheep selling well; complaints that fat cattle are killing light. Pigs are in stiff demand still.

Wheat only medium; owing to the rain did not fill properly; average yield about 11 to 12 barrels per Irish acre;

Queen's Co. price 17s. per barrel; sample fair considering the wet season. Oats a much lighter crop than 1909; yield about 14 barrels per Irish acre; price 8s. 3d. per barrel. The quality of the barley grain is fair, but yield is low—about 10 barrels per Irish acre; price about 13s. 6d per barrel. Potatoes will not give half the yield of last year; very bad, particularly on wet land; small in size with a large proportion diseased and soft in quality. Mangels a light crop owing to the cold, rainy summer. Late turnips are very bad, and early-sown fields are only fair in many places; some fields a complete failure from the constant wet of August. Cabbages fairly good. Pasture good on rich, dry land; on wet land poor.

Wheat a fair crop; only grown in patches. Oats variable; ripened late and was saved in prime condition; **Co. Westmeath.** average yield of grain and fine bulk of good, clean straw. A very poor yield of barley; not much grown, except in the Kilbeggan district. Rye a fair crop, and suffered less than the other cereals from the unfavourable weather. Potatoes a light, poor crop, with many diseased tubers; a great proportion small and of poor quality; varieties of the Up-to-date type have done best; Champions and British Queens are showing the highest amount of disease. Mangels and Turnips, where sown early and on dry soils, are fair; as a rule poor, and will be the lightest yield of roots obtained for years. Cabbage a bulky crop, but not hearting so well as could be wished. Pasture good; quality of the grass much improved since August. Cattle dropped 20s. a head within the past week. All classes of sheep are now fetching higher prices. Pig values have not been so well maintained of late.

Most of the threshing of the corn crops now completed; wheat disappointing in yield and poor in sample; the **Co. Wexford.** average is about 11 to 12 barrels per Irish acre. Oats a fine crop, was well saved and has yielded satisfactorily; winter oats did not do so well as the spring varieties. Barley not so good as last year in either quality or yield; a great many samples light and soft and hardly fit for malting; the average yield may reach about 15 barrels per Irish acre; price 18s. 6d. per barrel, and even lower, as the market is heavily glutted. Beans in the Kilmore district are stated to be a good crop. Potatoes in general a poor crop, especially where not sprayed; quality not good, and a great many diseased in some varieties; an estimated average yield is given as 8 tons per Irish acre. Mangels chiefly small, except on an occasional field; a poor, light crop. Turnips fair on dry land, very bad on wet land; complaints of finger and toe attack in some districts. Grass plentiful on pastures. Young cattle selling dearer than usual.

Wheat little grown; has been harvested in good condition; yield should be up to average, and the quality of the **Co. Wicklow.** grain fair. Such of the early oat crop as was cut in August was seriously damaged; most of the crop was, however, cut and saved during September in splendid condition, and in the mountainous districts cutting has even now only just been completed; where threshing has taken place, yields did not turn out to be so good as last year; on many farms the quality of the grain is poor; price is from 8s. to 9s. per barrel. Barley was, for the greater part, harvested under favourable conditions; yield about average; quality of grain fair. Potatoes are in most cases bad; tubers soft and deficient in quality, especially where

unsprayed; fully one-third of the crop are, in some cases, affected; where sprayed and on dry warm soil will be fair. Mangels below average. Turnips rather smaller than usual, but still growing. Cabbages average, and carrots fair. Pasture abundant and nutritious. Cattle are holding up well in price. Sheep, especially breeding ewes, are not so good as usual. Pigs are maintaining a high price.

Munster.

Wheat a fair crop, but did not fill well owing to bad weather at the time of ripening; only sown sparingly in some districts. Oats ripened unevenly, and is threshing out light; crop was well saved in September; the grain is a light sample, and, in many cases, injured in colour and soft in quality; average price obtained is about 9s. per barrel. Barley not much grown; having been late in ripening, was well saved; grain under average in most cases. Rye has given a very heavy crop of straw; grain average in quantity and quality. Potatoes are at present being lifted under favourable weather conditions; much below the average in quantity and quality; fetching double the price current in the local markets at the same period last year; a high proportion diseased, and eating quality very inferior; crop may be average where spraying was efficiently practised. Mangels and turnips have both improved much since early September, but the crop in general will be light. Pasture is good for the season. Forward cattle selling well. Pigs very dear, both young and fat.

Wheat threshing well; grain soft; prices low, 17s. to 18s. A large portion of the oat crop has been threshed; **Co. Cork.** black and white oats were both much damaged by the heavy rain of August; in consequence, many discoloured and depreciated samples; price 4s. 6d. to 5s. per cwt. Barley yields are variable; a large portion damaged and unfit for malting; price low, 14s. per barrel for malting, and 4s. 6d. to 5s. per cwt. for feeding purposes. Rye, where sown for soiling, looks well. Potatoes are just being dug; yield very disappointing; old varieties considerably diseased, especially Champions; will be under-average. Mangels have come on well of late, but will barely be average even on the dry soils. Swedes generally a medium return; early sowings have done best; many poor fields on low-lying land. Pastures very good. Cattle and milch cows doing very well. Beef a good price for the period of the year. Good stores selling dear, but thin stores in slack demand and selling badly. Sheep are improved in price, especially lambs, which show 5s. of advance. Pigs a good price, but have recently fallen to 56s. per cwt.

Wheat will not give an average yield; ripened late; there was some loss in the oat crop from shedding; very

Co. Kerry. uneven, depending on the class of soil; average on light sharp soils; on heavy and moory land lodged badly, and the grain was not filled at cutting time. Barley deficient in colour and light in bushel weight; only grown in one district. Rye sparingly grown; did best on loose, dry black surface land; ripened late and was well saved. The potato crop will return barely two-thirds of last year's yield; where spraying was not carried out, the tubers are soft and bad for eating; ten to twenty-five per cent. of the crop is diseased; there is an unusual proportion of small under-sized tubers. Mangels patchy and not nearly up to average. Turnips poor; the bulbs not in proportion to the leaves; where not well cultivated greatly over-ridden with weeds. Cabbage grew well late in the season, but not nearly so large a bulk of feeding as other years. Pasture good and a full supply of grass yet. Milch cows have yielded splendidly of late. Store cattle selling well, especially if in good condition. Springers very dear. Pigs keeping high in price.

Wheat not up to average; the grain did not fill out owing to lack of sunshine. Oats deficient in yield of grain,

Co. Limerick. but an over-average return of straw; sample soft and light. The potato crop will be rather light, even where spraying has been done; digging is now going on; tubers are small and appear insufficiently matured. Mangels below average; weather too cold and wet in August; improved much during September. Turnips are a light crop; should the weather remain fine, may yet grow out to be average. Cabbage a good crop; probably above average. Pastures are in nice condition; milch cows are keeping up their milk supply fairly well; fat and store cattle selling a little easier, but still reaching good prices; sheep much improved in value; pigs of all kinds very dear.

Wheat a good fair yield generally; did not fill well in some places. Oats a fair yield in some districts, but

Co. Tipperary. where badly lodged threshed out disappointingly; that portion of the crop cut in August was badly injured by the weather. Barley nearly all threshed; giving a poor return and the grain soft in quality as the result of bad ripening weather; prices at present show an upward tendency—from 13s. 6d. to 13s. 9d. per barrel. Potatoes are small and a considerable proportion diseased; not good generally. Mangels have turned out better than was anticipated at the end of August; have improved well since then and the leaves still green. Early sown turnips now promise a good yield; in some districts injured by Finger-and-Toe affection; greatly infested with weeds this season. Cabbages

a good crop, and being fed to dairy cattle at present. Pastures holding out well and plenty of grass available; dairy cows have done well and store cattle are in good condition and fetching remunerative prices; sheep are selling better than at this period last year; pig prices a record.

Wheat, where not cut too early, a fair crop and a good sample.

Oats well saved in most cases; the bulk of the **Co. Waterford.** crop has been threshed and the yield has proved light; early ripened fields cut in August gave a soft discoloured sample; the average is estimated at 12 to 15 barrels per statute acre; price about 8s. 6d. per barrel. Barley, where properly handled, turned out well, but the grain small and not of good colour; a larger proportion than usual not fit for malting; estimated yield 10 to 12 barrels per statute acre; average price prevailing, 13s. per barrel. In a few cases the potato crop has given a good yield; but generally not up to the average in either quantity or quality; poor except where sprayed twice; fully one-quarter to one-third of the crop diseased; varieties of the Up-to-Date type not so much affected as Champions, and are giving a much higher yield. Mangels improved a good deal during September; a very moderate crop, especially on wet and cold soils. Turnips generally not a good yield; appear to have too many tops; have made some improvement lately; early sown fields have done best. Pasture plentifully covered and a good start of autumn grass. Both dry stock and milch cows are doing well; the supply of milk is about average for the season.

Ulster.

Wheat has bulked well; all saved and stacked in good condition.

Lea oats under average; light in many districts;

Co. Antrim. on manured ground a good crop; was all secured in splendid order; much of it without a shower; appears to be threshing well. Barley sown on a greatly reduced area in the Ballycastle district; bulk deficient, quality good. Beans as a field crop have been very late in being harvested; a few fields are cut and have bulked well; the nature of the season encouraged the growth of haulms at the expense of pods. Potatoes very disappointing; small and few at the stalk; being raised in excellent weather; some good crops; others only middling; Champions and Skerries are yielding light; proportion of diseased tubers is stated to be not above the normal. Mangels little grown; very irregular; came on well during September. Turnips are not likely to be more than half as good as last year; a few early sown fields on good, dry land look well; on wet lands are soft and were ruined by the August rains. Flax suffered greatly from wet weather

during the handling; average bulk of straw, but yielding light; quality scarcely up to the average of other years; prices higher than they have been for years; good samples are fetching 80s. per cwt. freely. Pasture good and a fine bulk on the fields for cattle still. Dairy cows are milking well; abundance of hay and straw for winter keep, but the supply of roots will be considerably short. Cattle and young pigs are selling at good prices and pork rates are well maintained.

Wheat practically all in stack; gathered in fine condition; autumn sown fields turned out best. The oat
Co. Armagh. crop was all saved in splendid condition; not in general so good a yield as last year. Potatoes in most places a fair crop, except in heavy, wet soils; plenty of tubers but of small size; from some districts there are complaints of a great proportion of diseased tubers, especially among Champions. Mangels not so good as last year. Turnips also a short crop, and some fields almost a complete failure. Flax shows a fine bulk of straw, but there is an idea that yields will be small; a return of 20 stones to the bushel is estimated, and the prevailing price averages about 9s. per stone. Pasture is still nourishing; milch cows scarce and dear.

A small area of wheat sown; all safely harvested; grain will be soft, and yield not nearly so good as last year.
Co. Cavan. Oats a fair good crop; all well saved and gathered in; grain small and soft owing to the August rains; yield may be average; abundance of well-saved straw which will serve to make up for the deficiency in the quality of the hay as fodder for cattle this year. Rye was much injured by storm and wind; crop late and poor and is sure to yield badly. Raising of the main potato crop just commenced; broadly speaking, one-half decayed on heavy soils; one third, on lighter or moory soil; on the whole, a light poor crop—barely up to half last year's yield, except in isolated cases where there may be an occasional good field. Mangels and turnips grew well during the past month; yield of both these root crops will be deficient; fields terribly choked by weeds. Cabbage a good crop; were exempt from caterpillar attack this season. Pasture fair; a good year for aftergrass; cattle in good condition and prices satisfactory. Pork has dropped 4s. to 6s. per cwt. recently; young pigs scarce and dear, selling at £3 per pair; are likely to be cheaper on account of the bad potato crop.

Wheat an average crop and well saved; very little grown. Oats a good average crop and well saved; reports from
Co. Donegal. threshings show that yields are not so good as last year; prices are low—7d. to 7½d. per stone. Barley little grown except in patches for stock feeding; good, and

was well put together. Rye only grown in small plots for thatch; an average crop. Beans and peas hardly up to average in yield. Potatoes are a light crop; there is an unusually large proportion of diseased tubers, especially in Champions and Suttons; Up-to-Dates are not so bad in this respect. Mangels are blanky and below average, and on damp wet land are an entire failure. Turnips in damp land very poor; on dry soils a fair crop, and greatly improved during the past five weeks; generally deficient and full of weeds; a considerable amount of finger-and-toe in some districts. Cabbages good. Flax generally doing well and prices and demand appearing favourable; yield variable; not good where grown on heavy, damp land; little scutched yet; prices starting from 72s. to 80s. per cwt. Pasture good; cattle are doing and selling well; milch cows scarce and dear; young pigs very dear, from 30s. to 35s. each.

Wheat was well saved, but sample not so good as last year; not much threshed yet. Oats light on the

Co. Down. average; exceedingly well saved; sample hard, dry and well coloured; prices low; threshing out a satisfactory yield. Barley average; slightly damaged by the early rains after being cut. Beans a good yield; harvesting just proceeding. Potatoes are being raised and a fair crop, but not nearly so good a yield as the two preceding years; tubers small and amount of disease variable; quality for export purposes (Portaferry) expected to be good; markets at present overstocked and prices as low as £1 10s. per ton in some districts. Mangels a small crop, as the season was too cold and wet; in many places smothered by weeds. Turnips patchy and very irregular; small in size and greatly choked by weeds. Flax yields are variable but generally below the average, but prices good—from 8s. to 10s. per stone; owing to the good price and the fair yield, this will be the best paying crop this year. Pastures good and cattle have done well but somewhat back in price lately.

Wheat a very fair crop; only a little grown. Oats good and well saved; on good land a fine crop; on heavy, wet
Co. Fermanagh. land a light yield of both grain and straw; very little threshing done yet. Rye good, but late of being cut; grain will be light. Potatoes a very poor crop and generally not up to half last year's yield; greatly damaged by wet and the subsequent blight; a high proportion diseased, especially on low-lying fields where spraying was neglected or could not be got done owing to the season. Mangels a poor crop in general, except on a choice piece of dry land; suffered from lack of sunshine and heat. Turnips bad all round; fields very weedy and dirty; the wet weather prevented them from being properly cleaned; a

failure on wet land. Flax medium; not much grown, prices good. Pastures have done well since the dry weather set in. Cattle healthy and thriving well; springing cattle and milchers keep a high price; stores a little down. Young pigs very dear.

Wheat a good average crop; well saved and stacked. Oats were saved in splendid order; yield of grain will not be up to last year's standard; the sample is well coloured but small in the pickle; prevailing price low, about 7½d. per stone; straw is excellent for feeding, and will almost make up for the hay injured in August. Barley (in Coleraine district) scarcely average; excellently saved. Field beans look well; are being cut at present. Reports regarding the potato crop are variable; digging has just commenced; in some districts yields are fair; in others poor; in every case a good many diseased; Suttons are by far the worst affected variety. Mangels and turnips much benefited by the dry September and the rains that have fallen subsequently; some good fields on dry, light soils; very poor on heavy damp soils. Cabbage a moderate crop, but hearting well with the calm, mild weather. Flax turning out a fair crop; not much can be said about yields yet, but scutching fairly well so far; prices considerably advanced from last year—up to 10s. and 10s. 3d. per stone; the good prices should encourage larger sowings next season. Pasture finishing up well.

Wheat little sown; samples of grain good; yield average. Oats, as a rule, good and well saved; yield will not be up to last year's return. Potatoes are now being raised; good where planted early and sprayed twice; yields very variable; in some districts crop very deficient and a great proportion of the tubers diseased. Mangels and turnips are, as a rule, poor on heavy land and yields will be much below those obtained last season; except on dry ground, turnips will hardly reach half a crop. Cabbage promise a fine bulk of feeding. Scutching of the flax crop has just commenced; no yields yet to hand; the crop was got together in good condition at the end of the season, though some damage was done to it while on the spreadfield. Pasture good, and there are some fine fields of aftermath. Sheep and store cattle are selling well. Young pigs are as dear as ever, but there has been a drop in price of pork.

Wheat little sown; all favourably cut and stacked; promises average yield. Oats are a good crop and stacked in fine order; a heavy bulk of straw obtained; threshings are giving about an average return. Potatoes are variable; raising now general; fair on dry land, but poor on cold, wet, low-lying soils; much disease among Suttons;

Skerries not much affected and selling at £3 per ton in the Cookstown district; common opinion in the Strabane district is that the crop will be two tons per statute acre less than last year's yield. Mangels and turnips are mostly very poor and stunted; are picking up now fairly well, but both will be considerably below average. Cabbage a fair yield. Not much of the flax crop scutched yet; yields so far appear variable; prices good, up to 10s. per stone in the Cookstown district. Pasture good for the season; cattle still selling well; beef and stores a little cheaper; milch cows and springers very dear. Pork still keeps a good price, 60s. per cwt.

Connaught.

Wheat a fair crop; not much sown; was very late in ripening; quantity and quality of grain below average.

Co. Galway. The oat crop was saved in good condition though much of it is still in field stacks; the grain is not well filled and is not expected to yield well; straw is plentiful. Barley an average crop; threshing is finished in most places. Rye good but little sown. Potatoes are being lifted in the earlier districts; very large percentage of small and diseased; average yield of sound potatoes, not more than half last year's crop; very poor in quality; old Champions suffered most from disease. Mangels poor, irregular, and very weedy; have improved much in the recent dry weather; below average. Turnips have done badly and will be deficient in yield; finger-and-toe reported prevalent in some districts. Pasture is plentiful and a very good crop of aftergrass. All classes of cattle selling well, especially those in good condition and suitable for shipping. A good demand for ewes and lambs.

A fair average crop of wheat; most of it well harvested. Oats ripened much better than last year; the grain,

Co. Leitrim. however, did not fill well and a light yield expected in consequence; an abundant supply of well-saved straw. Rye has turned out better than was expected; was not so much damaged as the oat crop; will give a fair average. In general the potato crop is poor and much below the yield of the two preceding years; on some farms from one-quarter to one-third of the tubers are diseased; owing to the prospect of a scarcity, local prices are high, as much as 4s. to 6s. per cwt. Mangels met with an unfavourable season and are a light crop; especially poor on heavy, wet lands; are somewhat improved by the dry weather of the past month. Turnips are small and scalded looking on all heavy, damp soils; finger-and-toe is reported as fairly general. Cabbages a fair average crop; poor in some parts. Pasture did well generally, and no scarcity of grass. Cattle in fair condition and getting a ready sale; pork has had a considerable drop lately.

Only occasional plots of wheat grown; this crop has been well harvested, but the return of grain will not be up to last year's average; the straw is generally good. Oats all over a satisfactory crop; the grain in many cases rather poor in quality; was harvested in good condition. Rye medium and not up to the average, especially on bog lands; a fair bulk of straw and of good quality except where damaged by flooding. The potato crop can only be described as bad; tubers in most cases small and the yield scarcely half of what it was last year; fully one-fourth of the crop diseased; digging out now proceeding; present prices locally range from 4½d. to 7½d. per stone. Mangels on wet land almost a failure and poor in most cases; will be far below last year's yield. Turnips also poor and will give a small supply of feeding; finger-and-toe reported prevalent in certain districts. Cabbages are hearting well now. Reports regarding the flax crop grown in the Ballina district are favourable, but scutching has not yet commenced. Pastures, except where ruined by flooding, are good; cattle have come back a great deal in price lately; springers are especially dear; sheep are not high in price, but fully 5s. per head over the price this month last year.

Wheat a fair yield; grain rather light owing to the excessive wet at the ripening stage; white wheat seems to have filled better than the red; only a limited area grown. Oats rather light in grain, due to the wet season; there is a heavy yield of straw; harvesting was got through under ideal conditions; an average crop on the whole, except where lodged with wet. Rye was lodged very much; the good harvesting weather effected an improvement, and the yield will be average. The potato crop is about a third less than last year's yield and about one-fourth of the tubers are diseased; the disease has affected the crop most on old soils; prices locally have reached 8d. per stone (Boyle) and with every prospect of going higher before Christmas. Mangels and turnips have improved during September, but will not be so good generally as other years; some turnip fields badly affected with finger-and-toe; both crops are badly infested with weeds. Cabbage average; not so large an area grown owing to the dearth and scarcity of plants in the spring-time. Pasture never was better for the season; cattle in sufficiently forward condition for shipping are selling well; pigs are keeping a good price, and many will probably be fed to convert the diseased tubers to a profitable use.

Oats a good crop and saved in splendid condition; any that has been threshed yielded well. Rye fair but not

Co. Sligo. extensively sown. The potato crop will hardly bulk half as much as last year; in fresh land the crop is fairly safe; on old land about half the tubers are diseased; Champions seem to be the worst affected; the quality is also stated to be poor. Mangels a fair crop. Turnips only medium, except in some districts where early sown; will not return the same bulk of feeding as last year. Cabbage a very good crop. Pasture very good since the fine weather set in; cattle are selling well in fairs at remunerative prices; sheep are cheap to buy and dull in demand; pigs continue to fetch good prices.

THE IRISH FRUIT CROP, OCTOBER, 1910.

As a supplement to the Report on this year's Fruit Crop which appeared in the July issue of the JOURNAL, the following summary of reports received at mid-October through the courtesy of a number of the leading fruit-growers in each county, as well as from the Horticultural Instructors, indicates the special characteristics of the season.

Leinster.

Apples, on the whole, were a light crop, but in favourable situations the yield proved to be fair; large cooking

Co. Carlow. apples turned out the most plentiful. Pears were a very poor crop compared with other years; about one-third the usual quantity of fruit. Plums a very fair crop; Victorias gave the heaviest return; greengages were light. Damsons not up to average. The season was very unfavourable from mid-July to the 1st of September; the latter month turned out much drier, but still there was insufficient sun to ripen and colour the fruit satisfactorily. Scab on apples and pears, and canker were the most troublesome fungoid pests. Most of the apples were sold in bulk to local dealers; prices where sold, per hundred (120), ranged from 1s. to 3s. 6d.

Apples a poor crop and beneath average, but fruit good. Pears were average to bad. Plums almost a complete

Co. Dublin. failure, except in an occasional garden. Damsons also a light yield. The fine weather of September and October helped to colour the fruit well. Apples and pears are bringing good prices, but not high enough to compensate for the deficiency in yield.

Apples proved to be more plentiful than was expected in July; about third of the average yield; cooking varieties

Co. Kildare. carried the most fruit; young trees, as a rule, bore well; fruit from older trees small and of poor quality. Pears, except on walls, a quarter crop of poor fruit; much helped by the fine weather of September; late varieties are finishing well; there is no fruit on trees in the open. Plums, as a rule, scarce, except on wall trees; size and quality very good. Damsons fair but fruit small. September and October to date, being dry and warm, enabled all tree fruit to ripen and finish off well; the colouring, however, is not so good as in other years. Black scab prevalent on fruit from old trees; canker proved severe on some varieties. Prices were better this year owing to the small crop.

Apples have been a short crop; quality good but colouring deficient. Pears a fair yield; a poor crop, however, in some places; quality excellent. Plums were average; early Victorias were the best croppers; other varieties poor. Damsons scarce. The season was unfavourable to the proper colouring of fruit, which is effected best when showers and sunny weather alternate; the warmth of September came too late to benefit the fruit much in this respect. Considerable damage done in some districts from apple spot and pear scab. A large quantity of apples were shipped to English firms for jam-making at 3s. to 3s. 6d. per cwt.; good kinds have been sold to local dealers at 2s. per stone. Dessert apples brought from 2s. to 3s. per stone, and cooking apples from 10s. to 14s. per cwt.

Apples average; fruit rather under-sized and of poor colour. Pears a short crop. Plums below average; the **King's Co.** Victoria variety far the best in quantity. Damsons bad; practically a failure. Late fruits considerably benefited by the warmth of September. Apple scab was the worst of the fungoid diseases. Local prices: apples, 6d. to 1s. per dozen, according to size; pears, average 2s. per dozen; plums, 3d. per lb.

Apples on old trees a small crop; young trees bore a fair yield; fruit not so plentiful nor so large as last season. **Co. Longford.** Some good crops on old pear trees and a fair supply on walls; young trees in the open carrying little fruit. Plums abundant in general; Victorias excellent. Old damson trees well covered; young trees did poorly. All fruit deficient in flavour owing to insufficient sunshine. Apple spot prevalent, also canker. Apples bringing from 1s. to 2s. 4d. per stone according to size and quality; plums, 4d. to 6d. per lb.

Apples below average; a very light crop in some districts. Pears a poor yield in the open; a fair yield on wall trees. **Co. Louth.** Plums also light in the open. Damsons average. The latter half of the season favoured the development in ripening of the tree fruits; quality of the apples and other fruits compares favourably with last season's produce. Canker and apple scab were the most common of the fungoid troubles. Early apples sold at from 15s. to £1 per barrel; damsons fetching from 14s. to £1 per cwt.; plums, 12s. per cwt.

Apples a small crop after the heavy yields of last season; fruit of good quality and clean of disease. Pears not much grown; crop light and quality bad, particularly the early varieties. Plums a light yield in most districts. Damsons about half an average crop except in

very sheltered situations; quality good in general. The fine September saved and matured the apple and damson crops. Good apples can be sold at remunerative prices; early in the season damsons made from 18s. to 21s. per cwt.; prices, however, subsequently fell.

Apples only medium; some varieties proved a complete failure.

Pears very scarce. Plums generally light.

Queen's Co. Damsons a medium yield; not much grown.

Canker on apple trees encouraged by the wet summer. The spell of fine weather and sunshine in September has added much to the quality of both apples and pears.

On old apple trees fruit small and poorly developed; a poor yield; young trees did much better and carried
Co. Westmeath. a fair yield of fruit. Pears little grown; crop small but finished out well. Plums coloured nicely but deficient in flavour; gave a fair return, but not so good as last year. Old damson trees bore well; young trees a failure. Marketing of fruit practically local; apples (medium), 2s. per hundred; plums, 5s. to 6s. per stone; damsons, 1s. 6d. per stone. Apple orchards, which sold in bulk last season at from £12 to £18, were not worth more than from £4 to £6 this season.

Apples a fair average crop, especially on young trees; old orchards poor. Pears, on the whole, scarce,

Co. Wexford. though a few varieties bore freely. Plums below average. Damsons a light yield; little grown.

The recent mild weather has enabled the wood of apple and pear trees to ripen well, and there is every prospect of a good yield of fruit next year. Canker was the chief drawback to trees. Most of the apple crop is being disposed of locally, and are fetching on an average 2s. 6d. per stone, though some good varieties realised 4s.

Apples scarce both on old and young trees, with the exception of one or two varieties. Pears sparingly grown;

Co. Wicklow. a fair yield; very good on pyramids and on wall trees. Plums plentiful on walls; scarce on pyramid trees and in the open. Damsons not grown to any extent. American blight has not been so bad this year, but canker has been troublesome. Apples sold locally at 5s. per hundred and pears at 1s. per dozen; selected pears fetched 3s. per dozen in the Dublin market; good cooking varieties realised 8d. to 1s. per dozen locally; inferior sorts from 2s. 6d. to 3s. per hundred.

Munster.

Apples turned out to be more plentiful than was anticipated; old orchards have given a bad return, but young plantations are well laden. Fruit of good size; development of colour rather under average; crop not so heavy as last year. Pears are deficient, small in size and in quantity. Plums a small yield but quality good; Victoria variety gave a heavy return in sheltered situations. Fruit got a great check in August; was materially helped by September, and the later apples are finishing off very satisfactorily. Wood has, in consequence, also ripened and next year's prospects are good. A few varieties of apples were badly deteriorated in value by black spot; canker is unusually common. Prices obtained are satisfactory; well graded cooking apples are fetching from 9d. to 1s. per dozen; early dessert varieties also sold well, which compensated for the falling off in quantity.

Apples on old trees light, but some young trees cropped heavily; fruit did not swell much during August, but for the past month have improved in size and colour, especially the late sorts. Pears little grown in orchards; on walls a good yield and finishing well; may be deficient in flavour. Plums generally light; Victorias are an exception. Damsons little grown; a good yield in some orchards. Full-sized apples from young trees are selling locally from 5s. per hundred to 1s. per dozen; smaller fruit from old orchards are disposed of to dealers at from £5 to £10, etc., according to the crop and size of the orchard.

Apples a poor crop with the exception of one or two varieties; fruit exceptionally large and well coloured; young trees cropped best. Pears are less than a quarter crop except on walls or on well-protected trees, which have carried half a full crop; generally deficient in flavour. Plums good on walls; not much grown in the open. Damsons little grown; a poor crop. Fruit came on well and coloured satisfactorily during the past six weeks. Canker and apple scab noticeable in most orchards. Demand for all kinds of fruit, particularly apples and pears, good. Prices better than last year; most of the fruit is disposed of locally in small lots; best dessert varieties are fetching 9d. to 1s. per dozen; inferior sorts from 6d. to 9d.; choice-graded pears bringing 2s. per dozen.

Apple crop in general was light; young trees of some varieties have carried very well. Pears are poor except on wall trees, which have borne satisfactorily; the fruit has developed and ripened out well. Plum trees in favourable soils and situations bore a medium crop; on

Co. Limerick.

wall trees the fruit is of a good size. The principal fungoid diseases are apple and pear canker, also black scab. The major portion of the apple and pear fruit are sold in small-sized baskets or hampers to local fruiterers; current prices for fruit:—Apples (best quality), from 1s. to 1s. 2d. per dozen; good cooking, 2s. to 2s. 6d. per stone; pears, best quality, 10d. to 1s. 4d. per dozen; choice, 2s. per dozen; plums (Victoria), 2½d. to 3d. per lb.

Apples very variable according to district; in sheltered situations yield was fair; in exposed places the return is far below the average of other years. Pears under average; on walls a fair return. Plums scarce; variable, but a light yield in general. Damsons poor; not much grown. Crab apples scarce; in most places selling well. The latter part of the season has helped to ripen the fruit which otherwise would have been very poor in quality. Insect and fungus attacks not so prevalent as in other years. All fruit grown in the county is sold and consumed locally. Usual price for apples, 1s. 6d. per stone. Prices were good and growers satisfied.

Apples have come on well; a good average crop in some places; in other districts scanty; the fruit improved in other districts scanty; the fruit improved wonderfully in size and quality as it approached the ripening stage, especially the late varieties. Pears much under average and small in size; quality good. Plums are scarce generally and under average in quality. Damsons variable; fruit in general small. Crab apples an average yield. The splendid weather of September helped all kinds of fruit, and is bound to have a beneficial effect on next season's yield. Neither fungoid nor insect pests were as prevalent as usual. Prices obtained were:—Apples (new varieties), 6d. per dozen; plums, 3d. per lb.

Ulster.

Apples were a good average crop; better than anticipated; fruit, however, is smaller in size than usual; with the exception of a few varieties very clean in the skin. Pears poor except in favoured situations; crop as a rule thin and the fruit small. Plums variable; in most places a good crop and fruit of fair quality. Damsons about average. The recent good weather has favoured the maturing of late fruit; much cracking noticeable in apples, likely due to the excess of moisture in August. Apple scab not so prevalent as it was last year. Canker affected some varieties very much. Good prices for fruit, especially for fruit of good quality. A good deal of the fruit is sold by orchard, the buyer doing the picking and packing. Apples (medium) fetching from 5s. to 8s. per cwt.; fair to good,

from 8s. to 12s. per cwt.; choice well-graded fruit reached as high as 22s. per barrel (about 9 stones); plums sold from 14s. to 24s. per cwt.; Victorias fetched from 3s. to 3s. 6d. per stone; damsons brought from 10s. to 18s. per cwt.

Apples, taking the whole county into consideration, are a good average crop of clean even fruit; the quality is much superior to that of last year; freer of spot and larger in size; matured under very favourable conditions in September, which ensured very satisfactory colouring. Pears have finished well and are both large and clean; not much grown in the county; yield average to poor. Plums medium; Victorias the chief marketable variety, cropped well and showed good quality. Damsons a fair return of excellent fruit; yields varied considerably; as a crop were gathered and sold in perfect weather. On the whole, a good year for fruit-growers; quantity under the average but prices high owing to the failure of the fruit crop in other countries. Damsons reached the record of 20s. per cwt. in Glasgow. The apple crop was all well marketed and prices are certain to harden still more. Apple varieties all grew to a good size with the exception of Bramleys, which were, however, very plentiful on the trees. Current prices:—12s. per cwt. for late apples as picked from the trees; Bramleys are reaching 15s. per cwt. in the Portadown market; Grenadiers, 8s. to 14s. per cwt.; inferior cooking varieties make from 5s. to 10s. per cwt. Pears brought from 5s. to 25s. per cwt. according to quality. Victoria plums realised from 15s. to 25s. per cwt.; damsons 16s. to 24s. per cwt. A very satisfactory year for growers, some of whom have double last year's return with considerably less fruit.

Apples on young trees a fair crop; young Bramleys four years planted fruited well for the first time; early

Oo. Cavan. dessert varieties light; old orchards a failure.

Pears against walls and in favoured situations cropped satisfactorily; poor in the open. Plums moderate; Victorias did excellently; plentiful and of good size. Damsons not much grown; a poor return. The entire fruit crop much benefited by the spell of dry weather in September. Apple canker in badly-drained orchards was very prevalent; scab was also common. First-class varieties of apples brought good prices; the local rates were from 1s. 9d. to 2s. per stone; the large quantity of windfalls put on the markets kept down prices considerably.

Apples yielded a poor crop; about one-third of an average return.

Pears hardly an average yield. Plums rather

Oo. Donegal. light in most districts. Damsons little grown; no crop this year. The fine autumn has very much improved the quality of the fruit. Spot in apples was not so

noticeable this year. In many cases old orchards are sold by the lump sum to dealers. Coarse apples fetched, as a rule, from 1s. to 2s. per stone. Plums brought 2s. per stone and damsons 3s.

The apple crop is slightly below average. Pears about an average return, but fruit small; much improved during

Co. Down. the last six weeks. Plums were for the most part a failure. Damsons light; little grown. The early autumn has been very favourable for tree fruit, apples especially. Apple canker was the most common form of fungoid disease. Apples usually marketed at Belfast in barrels and hampers holding from 8 to 10 stones; prices varied from 8s. to 16s. per cwt.; really good fruit has been realising better prices this year than for many seasons past.

Apples below average generally; Bramleys cropped well, and in some places Grenadier and Lord Derby. Pears **Co. Fermanagh.** nearly a failure in the open; trees on walls an average crop in a few places. Plums variable; generally light. Damsons not much grown; generally light; in many places none. The heavy rains and low temperature of August checked the swelling of apples on heavy soils; the fine weather since the 1st of September has improved them, and late apples, as a rule, finished well. Scab is bad on some varieties of apples. Inferior boiling apples, known as "boilers," sold in bags locally to dealers at 3s. to 3s. 6d. per cwt.; the best paying variety is Bramley seedling, marketed in barrels from the middle of December to the end of January; the price at present locally is from 16s. to 20s. per cwt.

Apples much under average in quantity; young trees cropped fairly. Pears a small yield on young trees; old trees did better. Plums very variable; Victorias bore well in sheltered situations. Damsons little grown; a fair crop. Fruit got a good back-end for ripening. Insect and fungoid attacks not so troublesome as other seasons; canker and apple scab noticeable in some places. Markets chiefly local, though a small quantity of fruit was consigned to Glasgow and Stockport. Prices good: 13s. to 24s. 6d. per cwt. for apples packed in half-barrels was obtained in the Moneymore district. Plums brought from 20s. to 24s. and damsons 10s. to 14s. per cwt.

Apples good but somewhat irregular; will be below average. Pears a light yield, probably owing to the trees carrying a heavy yield last season. Plums good to average; little grown. Damsons fair; only grown in the south of the county. The latter half of the season has been altogether in favour of the development of the apple crop,

Co. Monaghan.

the quality being excellent. Bramley seedling, Lane's Prince Albert, Grenadier and Early Victoria were uncommonly good; of the dessert kinds, James Grieve, Gladstone, Lady Sudley and Worcester Permain cropped best. Apple scab was prevalent to some extent in new plantations. Prices of early apples, 12s. to 16s. per barrel; these have now advanced to 20s. and over on the English market for first-rate fruit. Plums, 18s. to 20s. per cwt.; damsons, 20s. per cwt. by local sale.

Apples half a crop on old trees; the newer varieties gave a fair return of good-sized clean fruit; yields on the whole variable. Pears very thin; about half a crop; quality good. Plums not much grown; below last year's return; quality fair; Victorias the best, as usual. Damsons 'a light bad crop. Fruit much improved both in size and quality since September set in. A little canker in some orchards. Prices were very good, apples ranging from 8s. to 16s. or more per cwt.; a good proportion of the fruit packed in barrels containing from 1 to 1½ cwt. was consigned to England and Scotland as well as to Dublin and Belfast markets. Inferior apples were marketed locally (Strabane) at 4s. per cwt. Damsons being scarce brought from 20s. to 22s. per cwt.

Connaught.

Apples an average crop of good fruit on young trees; on old trees the crop is below the average in quantity and quality; early varieties did not bear so well as the latter. Pears fairly good on wall trees; light on pyramids and in the open; a deficient yield on the whole. Plums very poor, except the Victoria variety on walls. Damsons not much grown; average yield. A great deal of fruit was blown off by the storm near the end of August; the fine weather of September improved matters greatly. Prices in local markets (Galway, Tuam, Ballinasloe) for good cooking apples (Grenadier, Lord Derby, etc.), range from 8d. to 10d. per dozen; at other local centres from 1s. to 2s. per stone. Good pears brought from 8d. to 1s. per dozen. Plums sold at from 8d. to 6d. per lb. The surplus fruit grown in the county can be disposed of locally at about Dublin market rates.

Apples fairly good but not so numerous as last year; turned out better than expected; yields very variable.

Oo. Leitrim. Pears a poor crop; deficient in flavour and small in size. A fair crop of Victorian plums. Damsons not grown. The latter part of the season helped the ripening of fruit which was greatly checked by the wet and cold during August. Any fruit grown for sale is disposed of locally.

Apples a very good crop in some sheltered gardens, but fruit small; the fruit on young trees seven to eight years planted is fair-sized. Pears average; little grown. Plums a fair yield but deficient in flavour. Damsons scarce and poor. The fine weather of September ripened apples and pears quickly, and dessert varieties were better coloured than last season. Canker is the most prevalent disease in fruit gardens. A ready market is found locally for good quality fruit and at remunerative prices; apples sold at 5s. to 5s. 6d. per creel in Ballina.

Apple crop, average to under-average and lacks colour. Pears a deficient yield; little grown. Plums scarce. Co. Roscommon. Damsons not much grown; several young plantations now started. A bad season in general owing to lack of heat and sunshine. Canker is the most troublesome fungoid pest.

Apples were a fair crop until the storms at the end of August caused much of the fruit to fall; not nearly so large a yield as the last two years, and, owing to the lack of sunshine, fruit did not grow large. Co. Sligo. Pears on walls good; poor in the open; trees cropped very variably. Plums irregular; some old trees bore well; a fair crop but ripened slowly. Damsons average; little grown; a very unfavourable season; the excessive wet during August kept the fruit from swelling. Apple scab and canker were the chief fungoid troubles. Marketing of fruit is mainly local, and prices fair according to quality. First-grade cooking apples sold at 10d. to 1s. per dozen; others at 2s. per stone; dessert apples (first grade) 8d. to 10d. per dozen; ditto (second grade) 2s. to 3s. per hundred. Pears 1s. 2d. to 1s. 6d. per dozen. Plums (dessert) 4d. to 6d. per lb; ditto (cooking) 2d. to 3d. per lb. A good local market exists for all surplus fruit grown in Sligo and other western counties.

SCHOOL GARDENS IN IRELAND.

From an educational point of view, considerable interest attaches to the schemes of instruction at present being employed in different parts of Ireland, in order to put to practical use the gardens attached to country National Schools. Generally speaking, the systems adopted are found to assume one or other of three forms. A type of the first method is to be seen where the teacher, who has himself received some training in agricultural and horticultural practice, directs and supervises the laying out of the space at disposal into plots which are assigned to the cultivation of the commoner farm crops and kitchen vegetables. The pupils are made acquainted with the location and number of the different plots assigned for the cultivation of each particular crop, and assist in preparing and drawing up a plan of the garden as so laid out.

Systems of Instruction.

Except the heavier manual work of digging in the springtime, the pupils are called on to do all the subsequent operations, such as making ready the seed-bed, sowing, hoeing, weeding, etc. As the season advances, the plots are visited periodically by the pupils in class form, and instruction regarding the identification, characteristics, merits, uses, etc., of the different crops and plants given by the teacher. In this way, the faculty of observation is encouraged and a greater interest in the ordinary routine of farming practice awakened.

In the second type of school garden, the space is utilized solely for the cultivation of the vegetables more generally required in plain domestic cooking, and, in consequence, the chief object aimed at is to make the pupils familiar with the use of the ordinary garden tools, and to give them a practical knowledge of vegetable cultivation. Instruction is given in class from a school text-book employed, and the pupils are thus made acquainted beforehand with the details of the operations which are to be carried out by them in the open. A third method of employing a school garden may be found in cases where, when the surrounding circumstances permit, it is chosen as a suitable centre for a horticultural demonstration plot, and the pupils in attendance are thereby enabled to follow observingly and under the direction of the teacher the best methods of growing vegetables and fruit.

The following detailed account of three typical school gardens, according to the above classification, shows the manner of working and the lines upon which instruction is given:—

**Agricultural
Instruction
at Tallow
National
School,
Co. Waterford.**

At Tallow, in the County Waterford, the plot of ground attached to the Boys' National School there is very advantageously used by the teacher to give the senior boys a practical acquaintance with the cultivation and uses of the several kinds of farm crops grown in Ireland, as well as the different varieties of grasses and clovers, and the more generally grown kitchen vegetables. The teacher, in this instance, received a short course of training in the old Model Farm in Glasnevin, under Messrs. Clune, Downing, and Gray, and though he had always the intention to put to practical use for the benefit of his country pupils the information and experience then gained, it was only about eight years ago when sufficient space became available for the purpose, that he found it possible to carry out his project. The original intention was to divide the space into four parts, and by tilling one of these each year to have a fresh plot under cultivation every fourth season. This idea, however, had to be abandoned, as it was found the overhanging trees, which shade the west fence of the garden, did not permit crops to be successfully grown on that side. Hence, the tilled portion of the garden is at present confined to the two divisions on the east side. This is divided into small plots on which are grown rye, barley, flax, turnips, mangels, rape and potatoes—the latter being made the object of a demonstration in showing the effects of being sprayed once and twice, and of being left unsprayed. A test with the three different classes of artificials, singly and in combination, is also carried out on the potato plot. A further succession of plots are devoted to the different grasses and clovers. The boys are made familiar with each of these as they come into flower, and are encouraged to make collections of each, neatly tied up and labelled. Finally, there is a series of plots devoted to the cultivation of such useful vegetables as white turnips, carrots, parsnips, lettuce, celery, etc. The teacher, as already stated, has the heavier digging done in the early spring, and provides the seed and manures, but the pupils are called on to hoe, weed and thin out, when necessary, the growing crops. General information on the various crops, their cultivation and uses are from time to time given, and invariably in the open garden with the object under discussion in full growth before the pupils. The garden is an object of much interest to the parents of the pupils and others in the district, and receives a great amount of observant notice from visitors during the season.

SCHOOL GARDENS IN IRELAND.

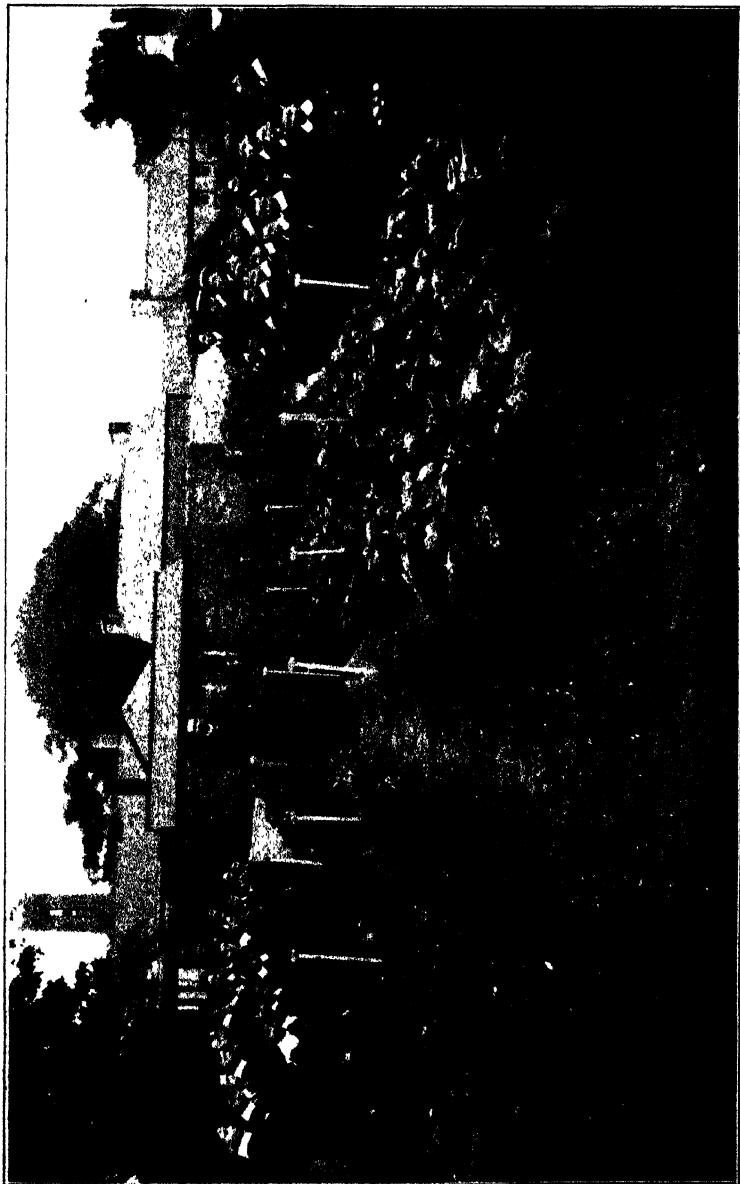
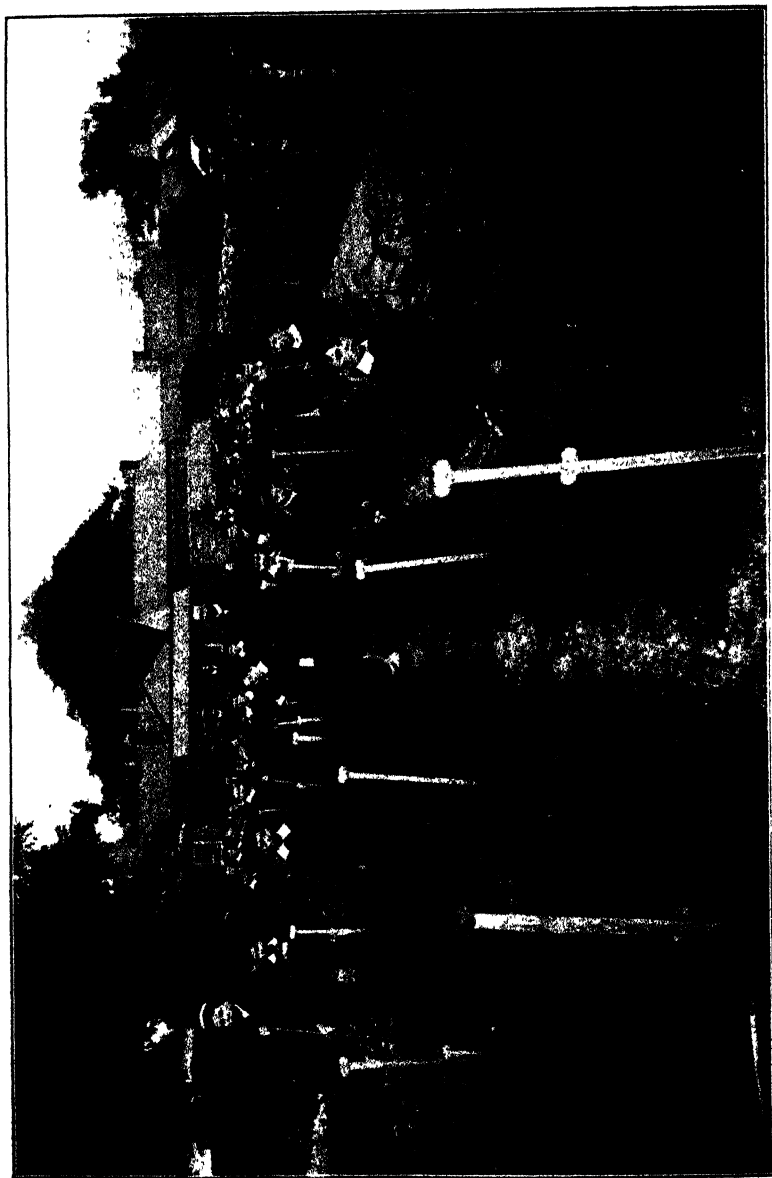


Fig. 1.—View of School Garden at Tallow, Co. Waterford. Instruction on the Root Crops.



**Fig. 2.—School Garden at Tallow, Co. Waterford. At work among the Grass Plots.
Teacher Superintending.**

**School Garden
Plots at
St. Johnston
National
School,
Co. Donegal.**

A second type of school garden has been in operation for two seasons at St. Johnston, Co. Donegal. Here the teacher had the school garden at his disposal laid out in plots each 18 feet by 7 feet; these were planted with vegetables classified in the following manner —

- (1.) Deep rooted, including carrots, parsnips, beet and parsley.
- (2.) Fibrous rooted, including turnips, cabbages, etc., and
- (3.) Pod-bearing, including peas and beans.

The scope of the garden admitted of 21 plots in all being laid out, and each of the plots was placed in charge of a senior and junior boy respectively, who were responsible for the preparation of the plot for the seed, assisted in the sowing of the seeds, and managed entirely the after cultivation, such as weeding, thinning, etc. Prior to taking part in outside operations, the teacher, who used a text-book on school gardening, discussed the different operations which were to be followed, and more or less prepared the pupils for what was about to be done in the open. The seeds, etc., were provided by the teacher, but at the end of the season it was optional for any boy who lived convenient to buy the produce of his plot for a small sum, the different vegetables to be removed as he desired for family use. The plots during the last summer proved most successful, and some excellent samples of the different descriptions of vegetables grown were raised.

As an example of the third method of utilizing a school garden for teaching purposes may be instanced that at Newmills—a small village which lies about four miles out of Dungannon in Co. Tyrone. Here the garden is attached to the teacher's residence, and not being connected with the school buildings is not under the control of the National Board. The teacher, however, is an enthusiastic horticulturist, and as his garden was situated in a very ideal centre for the neighbouring farming community to see, the County Committee of Agriculture, with the sanction of the Department, furnished him with materials to make it a Horticultural Demonstration Plot, and also enabled him to have the help and advice of the County Instructor in Horticulture. As such it has been fulfilling a useful purpose for the past three years, and the pupils in attendance at the school, who in their spare hours of recreation assisted in the weeding and other operations, could not fail to be benefited by the object lessons in gardening brought so practically before them.

**Horticultural
Demonstration,
Plot attached
to Newmills
National
School, Co.
Tyrone.**

WINTER MILK PRODUCTION.

[** In Volume IX. No. 4 (July, 1909) of the JOURNAL there appeared reports of experiments relating to Winter Milk Production carried out on two farms in Co. Cork. An article in Vol. X No. 1 (October, 1909), gave an account of similar experiments conducted on two farms in County Down. The following paper sets out some results obtained at the Agricultural Station of Clonakilty during the period 1906-9.]

EXPERIMENTS, 1906-7.

The experiment was started in October, 1906. The objects were:—

- 1st. To ascertain the cost per gallon of producing milk in winter.
- 2nd. To ascertain if winter dairying would pay in the south of Ireland.

With these objects in view six cows were purchased for the purpose, but as one of them died in December the number was reduced to five instead of six, as originally intended.

The following table gives particulars regarding date of calving, **Milk Yield, etc.** number of days in milk, yield of milk, and average per cent. of butter fat:—

TABLE I.

1ST YEAR.

No.	Date of calving.	Number of days in milk.	Yield in gallons.	% of butter fat.
1	14th October, 1906.	293	662.7	3.32
2	21st	293	711	3.54
3	22nd	292	856.6	3.26
4	26th	276	868.9	3.58
5	29th	275	890.8	3.72

Total yield, 3,990 gals.

Average yield per cow, 798 gals.

Average % of Butter fat 3.49.

No. 5 did not calve the following year till the end of December. On August 1st, when she had been milking nine months, she was still giving a yield of 2 gallons per day. In this and in every other case in the following years, when a cow did not calve within thirteen

months, the milk yield after the end of the ninth month is not included in the returns, but is set against extra depreciation. On the other hand, some of the cows calved within the twelve months, so that whatever extra gain in yield of milk was got from the cows that did not calve till after twelve, but within thirteen, months is counter-balanced by the loss in yield on those that calved within the year.

Table II. (1st year) gives details of the quantity of milk produced each month, average daily yield per cow each month, and average per cent. of butter fat.

TABLE II.

1ST YEAR.

Month.	Quantity of milk in gallons pro- duced during the month.	Average daily yield in gallons.	Average % of butter fat.
October, 1906, . . .	125	2.60	4.08
November „ . . .	546.75	3.64	3.50
December „ . . .	555	3.58	3.34
January, 1907, . . .	512.25	3.30	2.94
February „ . . .	427	3.05	2.82
March „ . . .	394	2.54	3.32
April „ . . .	379	2.52	3.52
May „ . . .	458.75	2.95	3.50
June „ . . .	349	2.33	3.86
July „ . . .	208.25	1.34	3.98
August „ . . .	35	.90	—
Total, . . .	3,980 gallons	Average 2.61 gals.	Average 3.49

When in full milk during winter each cow had a daily allowance of

Food Consumed. 56 lbs. Roots.
6 lbs. Cake and Meal.
12 lbs. Hay (this was found to be as much as they would eat).
4 lbs. Oat Straw.

The concentrated food consisted of about—

2 parts Decorticated Cotton Cake.
1 part Bruised Oats.
1 part Bran.
1 part Dried Grains.

As the yield of milk decreased the quantity of meal was gradually reduced to 4 lb. each per day. In spring the Decorticated Cotton Cake was replaced with Bean Meal, made from beans grown on

the farm. The Cotton Cake was fed dry. The other concentrated foods were mixed with pulped roots and cut hay, and steamed with boiling water. After calving and up till about the end of April the cows were allowed out for an hour or two on good days for exercise. In the first week in May the cows were turned on to the grass night and day. No cake or meal was allowed afterwards. The only hand feeding supplied after this date was soiling for a short period until there was a full bite of grass.

In calculating the cost of producing milk an important factor is the prices charged for the bulky home-grown produce. In the following calculations hay is charged at 50s., straw at 30s., roots, including pulping, at 10s., and soiling (rye and vetches) at 15s. per ton. Purchased meal and cake are charged at cost price, and home-grown meals at what they would have realised if sold in the market.

Milking is charged at 5d., and attendance during winter at 7d. per week per cow. Fuel is charged at 5s. per

Other Costs head. The water was not specially boiled for the
of Production. purpose, but was taken from that used for scalding meal for pigs.

Another important factor in estimating the cost of producing milk is the amount charged for depreciation and risk. This item must of necessity vary considerably in different localities, and even in different farms in the same district, so that it is a difficult matter to arrive at a figure that would apply to the country as a whole. To obtain an approximate figure applicable to the case in question, the depreciation and loss on the 40 cows kept on the farm for the last three years has been taken. It was found to amount to close on 10 per cent. per annum. To this has been added $2\frac{1}{2}$ per cent. for possible contingencies. Under the system where cows are milked for one season, and replaced by springers, the depreciation may be considerably higher.

Table III. (1st year) shows approximately the cost of producing a
Cost of gallon of milk with cows calving in October, 1906.
Production.

TABLE III.

1ST YEAR.

FIVE COWS.

	£	s.	d.	£	s.	d.
Food, grazing and litter,	51	0	6			
Milking,	4	5	3			
Attendance (exclusive of milking),	3	15	10			
Service of Bull,	1	5	0			
Fuel,	1	5	0			
Interest on Capital £100 at 4%	4	0	0			
Depreciation and loss,	12	10	0			
				78	1	7
5 calves at 30s. each,	7	10	0			
Manure at 18s. per cow,	4	10	0			
				12	0	0
				£86	1	7

Cost of producing 3,990 gallons, £86 ls. 7d.

Equal to 3·97d., or say 4d. per gallon.

The experiment was continued on the same lines during the two following winters. Tables similar to those for 1906-7 are given showing the yield of milk, cost of production, etc.

EXPERIMENTS, 1907-8.

In the winter of 1907-08 ten cows were under experiment, with the following results:—

Table No. I (2nd year) gives particulars regarding date of calving
Milk Yield, etc. number of days in milk, yield of milk, and average per cent. of butter.

TABLE I.

SECOND YEAR

No.	Date of calving.	Number of days in milk.	Yield in gallons.	% of butter fat.
1	29th September, 1907,	301	567·9	3·38
2	30th " "	275	757·	3·50
3	2nd October, " "	335	861·4	3·50
4	15th " " "	308	803·9	3·32
5	21st " " "	275	678	3·44
6	21st " " "	286	475·4	3·30
7	25th " " "	295	716·4	3·40
8	28th " " "	279	775·4	3·70
9	29th " " "	311	859	3·27
10	30th " " "	292	566·6	3·50

Total yield, 7,061 gallons.

Average yield per cow 706 gallons.

Average per cent. of Butter fat 3·43.

No. 2 and No. 5 did not calve within the 18 months; the milk is, therefore, only taken till the end of the ninth month. The average yield per cow is 92 gallons less than it was the previous year. This is in some measure due to No. 6, which was an "ill doer," and also to the backward state of the grass in the month of May. This is clearly shown by a comparison with Table II. (1st year), from which it will be seen that, instead of the yield per cow being fully half a gallon more per day in May than in March and April, as was the case in 1907, it remained practically the same for the three months. Even this, however, is much better than would be the case with spring calvers at the same period of lactation, as instead of remaining constant, the yield would have gone back considerably.

Table No. II. (2nd year) gives details of the quantity of milk produced each month, average daily yield per cow each month, and average per cent. of butter fat.

TABLE II.

SECOND YEAR.

Month.	Quantity of milk in gallons pro- duced during the month.	Average daily yield in gallons.	Average % of butter fat.
September, 1907,	4.4	2.20	3.05
October "	441	3.20	3.28
November "	938.6	3.10	3.30
December "	951.8	3.70	3.20
January, 1908,	863.6	2.76	3.40
February "	741.9	2.50	3.47
March "	684.2	2.20	3.42
April "	650.5	2.17	3.21
May "	683.8	2.20	3.67
June "	677.7	2.25	4.00
July "	340.9	1.20	4.10
August, "	82.6	1.10	—
Total .	7,061 gallons	Average 2.32 gallons	Average 3.43

The feeding was much the same as in the previous year, except that the soiling had to be continued later owing to the backward spring.

Table III. (2nd year) shows approximately the cost of producing a gallon of milk with cows calving in October, 1907.

TABLE III.

SECOND YEAR.

TEN COWS.

	£	s.	d.	£	s.	d.
Food, grazing and litter,	108	19	3			
Milking,	8	10	6			
Attendance (exclusive of milking),	7	11	8			
Service of Bull,	2	10	0			
Fuel,	2	10	0			
Interest on capital £200 at 4%,	8	0	0			
Depreciation and loss at 12½%,	25	0	0			
				163	1	5
10 Calves at 30s. each,	15	0	0			
Manure at 18s. per cow,	9	0	0			
				24	0	0
				139	1	5

Cost of producing 7,061 gallons, £139 1s. 5d.

Equal to 4·73d. or say 4½d. per gallon.

As was to be expected from the lower yield of milk and slightly increased cost of feeding, the cost of production has increased from 4d. to 4½d. per gallon.

EXPERIMENTS, 1908-9.

In the winter of 1908-09 five cows were under experiment, with the following results.

Table No. I. (3rd year) gives particulars regarding date of calving, **Milk Yield, etc.** number of days in milk, yield of milk, and average per cent. of butter fat.

TABLE I.

THIRD YEAR.

No.	Date of calving.	Number of days in milk.	Yield in gallons.	% of butter fat.
1	9th October, 1908,	310	723·8	3·2
2	14th " "	297	746·5	3·4
3	15th " "	304	780·7	3·6
4	29th " "	275	695·2	3·4
5	31st " "	273	671·4	3·3

Total yield 3,617·6 gallons.

Average yield per cow 723·5 gallons.

Average per cent. of Butter fat 3·34

The average this year is 17½ gallons higher than the previous year, but still 74½ gallons below the average for 1906-07.

The following table (No. II., 3rd year) gives details of the quantity of milk produced each month, average daily yield per cow each month, and average per cent. of butter fat:—

TABLE II.

THIRD YEAR.

Month.	Quantity of milk in gallons produced during the month.	Average daily yield in gallons.	Average % of butter fat.
October, 1908,	196.7	3.39	3.30
November „	502.1	3.34	3.14
December „	498.3	3.21	3.16
January, 1909.	436.6	2.81	3.16
February „	344.8	2.46	3.35
March „	337.3	2.17	3.42
April „	339.3	2.26	3.44
May „	374	2.41	3.50
June „	403.9	2.68	3.62
July „	161	1.07	3.65
August „	23.6	.90	—
Total, . .	3,617.6 gallons	Average 2.43 gallons.	Average 3.34

Table III. (3rd year) shows approximately the cost of producing
Cost of a gallon of milk with cows calving in October,
Production. 1908.

TABLE III.

THIRD YEAR,

FIVE COWS.

	£	s.	d.	£	s.	d.
Food, grazing and litter,	49	18	2			
Milking,	4	5	3			
Attendance (exclusive of milking),	3	15	10			
Service of Bull,	1	5	0			
Fuel,	1	5	0			
Interest on Capital £100 at 4%,	4	0	0			
Depreciation and loss at 12½%,	12	10	0			
				76	19	3
5 Calves at 30s. each,	7	10	0			
Manure at 18s. per cow,	4	10	0			
				12	0	0
				64	19	3

Total cost of producing 3,618 gallons, £64 19s. 3d.
 Equal to 4.3d. or, say, 4½d. per gallon.

The reduction of nearly one halfpenny per gallon from the previous year is partly due to the higher milk yield and to a slightly reduced cost per head for feeding.

SOME RESULTS OBTAINED.

Taking the three years the average yield per cow is 733 gallons, and average per cent. of butter fat 8.42.

The comparatively high yield, considering the cows were not forced in any way, is much above the average of the country. This must not be attributed altogether to the capacity of the individual cows for producing milk; but is in a large measure due to the time of calving. When cows that calve in autumn get the young fresh grass in the month of May they make what may be called a second spring in milk, and the yield increases considerably, instead of falling off, as is the case with spring calving cows at a similar stage of the lactation period. This, however, would not apply to the same extent in districts where the spring in grass is much later than at Clonakilty.

A glance at tables No. II. will show that in the months of May and June, when the cows were seven and eight months calved, the daily average for the three years was only slightly under $2\frac{1}{2}$ gallons. Even in July, when the cows were nine months calved, their average yield was about $1\frac{1}{2}$ gallons each per day. Against this take the case of cows calving in April, the corresponding months would be November, December, and January, when the cows would be nearly dry. Even supposing the spring calving cows were to get the same feeding during these months as the ones that calved in October the yield would still fall short of the May, June, and July record of the autumn calving cows. A cow might respond freely to extra feeding when in full milk and give a very poor return for it when nearly dry.

There is another item in connection with winter dairying that helps to keep down the expenditure and reduce the cost of production. During the unproductive season, when cows are dry, they can be kept much cheaper on the grass in autumn than they can with hand feeding in the spring. Moreover, the autumn calvers have, as a rule, a longer milking period, and still are generally in better condition to start the next milking season. The question arises—Would it be better to have the cows calving earlier, say, in the month of August? This is very doubtful, as by May the cows would be nine months calved and would have to be put dry in a short time, provided they were to calve at the same time the following year, and they would not, therefore, get the advantage of the early summer grass to help to increase their yield above the normal.

Another important factor, not only in the matter of milk production, but in feeding all kinds of stock, is what may be termed the "point of diminishing returns," that is, where the returns are not commensurate with the increased cost of production. Had the cows in question been supplied with a more liberal diet no doubt

the yield of milk could have been increased, but it is quite possible the cost of production per gallon would have been increased at the same time. Where milk is retailed in cities at 1s. or 1s. 4d. per gallon in winter, it would very likely pay to give more than 6 lb. of concentrated food; but when it has to be sold at 5d. or 6d. it is a different matter. An extra 8 lb. of meal per day, costing about 2d., and yielding, say, an extra quart of milk, would leave a profit of one penny when the milk is sold at 1s. per gallon, but if it has to be sold at 6d. per gallon, instead of the extra meal leaving a profit it would result in the loss of one halfpenny. Even when the price obtained for the milk leaves a profit on the extra feeding, it is suggested that it would be better, where circumstances permit, to keep one or two extra cows, as the case may be, and so keep the cost of production at the minimum.

To go back to the first object of the experiment, viz., the cost of producing milk in winter: the average of the twenty cows for the three years is practically 4½d. per gallon; but although the cows calved in October, the whole of this cannot be considered winter milk, as one-third of it was produced after the first week in April.

The answer to the second object of the experiment, viz., does winter dairying pay, must depend on a great variety of circumstances, the most important of which are:—

1st.—On the class of cows kept.

This is clearly demonstrated in the second year of the experiment. The cost of production for No. 6 is 7d. per gallon, while for No. 9 it is a little less than 4d. The difference in the yield of the two cows was 384 gallons, while the percentage of butter fat was practically the same. If this is taken at the cost of production for that year, viz., 4½d. per gallon, the difference in the money return is £7 12s., while the difference in the cost of keep of the two cows was less than £1.

2nd.—On the price realised for the milk.

Where first class butter is made at home, or where a creamery exists, there should be no difficulty in realising a fair profit over and above the cost of production. After allowing one penny per gallon for the separated milk, the part (one-third) that may be classified as summer milk should realise a price that would cover the average cost of production, while the winter portion (two-thirds) would leave what may be considered a fair profit.

3rd.—On the kind and quantity of food supplied.

A fairly liberal, but not too extravagant, diet must be allowed. It is well to remember in this connection that it will neither pay to starve nor to overfeed, and that the "point of diminishing returns" is much higher (as far as the food is concerned) for a good than for a "bad doer." It is also well to keep in mind that no amount of

food will ever convert a bad milker into a good one. The production of milk depends upon the individual character of the cow far more than upon the food supplied.

4th.—It is essential that at least the bulky foods should be produced on the farm. Otherwise winter milk production cannot be expected to prove remunerative.

5th.—Freedom from abnormal losses.

The 12½ per cent. allowed for depreciation and risk in the estimates should be sufficient to keep up the stock on most farms; still there are cases where, owing to a heavy death rate, abortion, or failure to get most of the cows to calve at nearly the same time the following year, it would be considerably higher. On the other hand, where there are no abnormal losses, and where young heifers are reared to replace worn-out cows, the depreciation would be much less, as the young cows would be increasing in value; but under these conditions the yield of milk would also be less.

6th.—Ordinary care and attention.

No doubt at Clonakilty the stalls are much better, both as regards comfort for the cows and facilities for feeding, than are found on most farms. However, the question of accommodation alone need not deter anyone from trying winter dairying. Until a short time ago it was considered essential for the production of winter milk that cows should be kept at a fairly high temperature. Recent investigations, however, have shown that this is not the case. All that is required in the way of housing is to keep the cows in byres that are clean, well lighted, and well ventilated, free from draughts, and not to allow them to stand at gates up to the knees in mud in all sorts of weather.

JAMES L. DUNCAN

WINTERING YOUNG STORE CATTLE.

REPORT ON AN EXPERIMENT CARRIED OUT AT CLONAKILTY AGRICULTURAL STATION.

Much diversity of opinion exists as to the merits of the different systems of wintering young stock, and accordingly **The Object of the Experiment.** an experiment was carried out to test whether it is better to house young cattle or to leave them outside altogether throughout the winter.

On December 14th, 1908, ten calves that were born during the autumn of 1907 between September 29th and November 9th (average age nearly 14 months) were divided into two lots of five in each.

In each lot there were three of the ordinary shorthorn and two crosses between a Polled Angus bull and the ordinary shorthorn type of cow. One lot was left outside altogether, on a field with a good deal of rough pasture, on which cattle had been fed with cake during the previous summer. It was rather exposed, with no shelter whatever, except what could be got behind a stone wall. At the same time they had good dry land to lie on. The second lot were housed at night in a well-ventilated shed, and had a run out during the day when the weather was favourable on a bare field, on which there was practically nothing to eat.

The experiment was repeated last winter (1909-10) with ten calves of about the same age, and of a similar description. Owing to extreme drought and want of pasture during the late summer and autumn months the calves, on an average, weighed about $\frac{3}{4}$ cwt. less than the lots of the previous year.

Table I. shows the quantity of hand feeding consumed by each lot from the dates the experiments started, December 14th, 1908, and December 17th, 1909, till May 1st, when they were put on the grass.

TABLE I.

1908-09.

Food.	Inside lot.			Outside lot.		
	Ton	Cwt.	Qr.	Ton	Cwt.	Qr.
Hay,	2	14	2	1	4	3
Roots,	14	2	0	—		
Cake and Meal,	0	11	3	0	11	3

1909-10.

	Ton	Cwt.	Qr.	Ton	Cwt.	Qr.
Hay,	2	12	2	0	9	3
Roots,	14	2	0	—		
Cake and Meal,	0	17	1	0	17	1

The meal mixture was made up of:—

2 parts Linseed Cake.

1 part Indian Meal.

1 part Crushed Oats.

In 1908-09 each calf was allowed 2 lb per day till 20th April, when it was reduced to 1 lb In 1909-10 they got a daily allowance of 8 lb, which was reduced to 2 lb during the month of April. The outside lot consumed much less hay than the lot of the previous year, owing to an earlier spring in the grass

The inside lot on an average consumed fully 3 stones of roots daily

Table No II shows the weight of each calf when the experiment started, the weight when the two lots were put together, and the increase during that period

TABLE II.

1908-09

Inside lot				Outside lot			
No	Dec 14	May 1	Increase	No	Dec 14	May 1	Increase
	C Qr lb	C Qr lb	C Qr lb		C Qr lb	C Qr lb	C Qr lb
1	7 2 0	8 1 21	0 3 21	1	7 0 7	7 3 14	0 3 7
2	7 1 7	8 1 7	1 0 0	2	6 2 14	7 0 0	0 1 14
3	6 0 21	7 0 0	0 3 7	3	5 3 14	6 2 21	0 3 7
4	5 3 7	6 3 21	1 0 14	4	6 1 0	6 3 7	0 2 7
5	5 0 7	6 0 0	0 3 21	5	6 0 21	6 3 7	0 2 14
Total,	31 3 14	36 2 21	4 3 7	Total,	32 0 0	35 0 21	3 0 21

Difference 1 cwt 2 qr 14 lb

1909-10

No	Dec. 17	May 1	Increase	No	Dec 17	May 1	Increase
	C. Qr. lb	C. Qr. lb.	C. Qr. lb		C Qr lb	C Qr lb	C Qr lb
1	6 0 0	6 2 14	0 2 14	1	5 3 0	6 0 14	0 1 14
2	5 0 21	5 2 7	0 1 14	2	6 3 0	6 2 14	0 0 14*
3	6 3 0	8 0 0	1 1 0	3	5 2 0	5 3 0	0 1 0
4	5 1 0	7 0 7	1 3 7	4	4 3 7	5 2 0	0 2 21
5	5 1 0	5 1 7	0 0 7	5	5 3 14	6 2 14	0 3 0
Total,	28 1 21	32 2 7	4 0 14	Total,	28 2 21	30 2 14	1 3 21

Difference 2 cwt. 0 qr. 21 lb.

* Decrease.

In 1908-09 the inside lot consumed 14 tons 2 cwts. roots and 1 ton 9 cwts. 3 qrs. more hay than the outside lot, while the extra gain in weight was only 1 cwt. 2 qrs. 14 lb. In 1909-10 the difference in the feeding was 14 tons 2 cwts. roots and 2 tons 3 cwts. hay, and the gain was 2 cwts. 0 qr. 21 lb. Against this has to be set the value of the pasture on which the outside cattle were grazed during winter.

If we allow 1s. per head per week, which would more than cover the quarter of the rent of the field, and charge 50s. per ton for hay and 10s. for roots, the inside lots would cost fully £13 extra for the two years, to get an increase of 3 cwts. 3 qrs. 7 lb., or 26s. per head to get an increase of 1 qr. 14 lb. per head.

Again, the value of the manure made by the inside cattle must be taken into account, but this may be set against straw used for litter and extra cost of attendance. Owing to their extra condition and "bloom" (more especially in 1910) it is probable that if all the calves had been sold at the end of April, the inside lots would have realised a sufficiently higher price to repay most of the extra cost, but by midsummer there was very little (if any) difference in their appearance. The cattle were weighed every month for comparison, although in the tables the figures for December and May only are given. It was noticed in February, 1909, when the weather was dry and cold, although there was no spring in the grass the outside lot put on good weights; while in March, when there was a good deal of rain and a fair spring in the grass, they fell off in condition.

Owing to cold, wet weather experienced in January, February, and the first half of March, 1910, the outside lot wasted a good deal, with the result that, there was a difference of 4 cwts. 2 qrs. 7 lb., or nearly 1 cwt. per head between the two lots from the time the experiment started until 16th March. After this there was an improvement in the weather and a spring in the grass. The outside lot from that date until 1st May did much better than the inside lot, and reduced the difference to 2 cwts. 0 qr. 21 lb. At the end of April, 1910, one of the outside lot was 14 lb. less weight than in the middle of December, while one of the inside lot had gained only 7 lb.

It was deemed advisable to continue the experiment to see if the winter feeding would have any effect on their subsequent growth. Both lots each year were, therefore, treated exactly alike till 1st July. The experiment was then brought to a close, as it was considered the effect (if any) of the winter feeding was at an end.

Table III. shows the weight of each animal on May 1st, when the two lots were put together, weight of each animal on 1st July, when the experiment concluded, and increase during that period

TABLE III.

1908-09.

Inside lot.				Outside lot.			
No.	May 1.	July 1.	Increase.	No.	May 1.	July 1.	Increase.
	C. Qr. lb.	C. Qr. lb.	C. Qr. lb.		C. Qr. lb.	C. Qr. lb.	C. Qr. lb.
1	8 1 21	9 1 14	0 3 21	1	7 3 14	7 3 7	0 0 7*
2	8 1 7	9 3 7	1 2 0	2	7 0 0	7 3 0	0 3 0
3	7 0 0	7 1 7	0 1 7	3	6 2 21	7 3 14	1 0 21
4	6 3 21	7 3 7	0 3 14	4	6 3 7	7 3 7	1 0 0
5	6 0 0	6 2 14	0 2 14	5	6 3 7	7 2 0	0 2 21
Total,	36 2 21	40 3 21	4 1 0	Total,	35 0 21	38 3 0	3 2 7

* Decrease.

1909-10.

Inside lot.				Outside lot.			
No.	May 1.	July 1.	Increase.	No.	May 1.	July 1.	Increase.
	C. Qr. lb.	C. Qr. lb.	C. Qr. lb.		C. Qr. lb.	C. Qr. lb.	C. Qr. lb.
1	6 2 14	7 0 7	0 1 21	1	6 0 14	7 0 7	0 3 21
2	5 2 7	6 0 0	0 1 21	2	6 2 14	7 3 0	1 0 14
3	8 0 0	9 1 0	1 1 0	3	5 3 0	6 2 21	0 3 21
4	7 0 7	8 0 7	1 0 0	4	5 2 0	6 1 7	0 3 7
5	5 1 7	6 2 7	1 1 0	5	6 2 14	7 1 7	0 2 21
Total,	32 2 7	36 3 21	4 1 14	Total,	30 2 14	35 0 14	4 2 0

On first sight it would appear that the inside lot in 1908-09, with a gain of 4 cwts, 1 qr. during May and June, did better than the outside lot, with a gain of 3 cwts. 2 qrs. 7 lb.; but when we examine the individual gain and loss on the different animals, it will be noticed that No. 1 in the outside lot was 7 lb. lighter on 1st July than on 1st May. Although this animal was apparently not suffering from any disease, still from some unaccountable reason it did not thrive during the early summer.

Taking the two years together, the total gain on the ten inside cattle for the two months, May and June, was 8 cwts. 2 qrs. 14 lb., and for the ten outside ones 8 cwts. 0 qr. 7 lb. From those figures it would appear that the winter feeding had no effect on their subsequent growth.

The climate of Clonakilty cannot be considered typical of a very large area, and different results might be obtained in a different locality or with different feeding. From observations made every month it would appear that excessive wet has a far more injurious effect on outlying cattle in winter than protracted cold. Owing to the small number of cattle experimented upon, it would be premature to form a decided opinion on the different systems. At the

same time, given a climate like Clonakilty, dry land to lie on, and a fairly sheltered field, the
Provisional experiment indicates that strong, healthy young
Conclusion. cattle might be wintered cheaper outside altogether than when housed at night.

JAMES L. DUNCAN.

THE LONDON DAIRY SHOW.

The annual Dairy Show held in the Royal Agricultural Hall, Islington, from the 4th to the 7th of the present month marks the thirty-fifth fixture of the kind which has been organised by the promoting Society—The British Dairy Farmers' Association. As stated in the current catalogue of the Show:—

**Objects of the
British Dairy
Farmers'
Association.**

“The objects of the Association are the improvement of Dairy Stock and Dairy Produce, by encouraging the Breeding and Rearing of Stock for the special purpose of the Dairy; a larger and more general production of Butter, Cheese and Eggs; the Erection of Improved Dairy Buildings, and the Invention of New or Improved Dairy Utensils, Machinery, Implements, and Scientific Appliances. The Association also stimulates the Breeding and Rearing of Poultry, etc. By means of Papers in the Society's 'Journal' (published annually), Annual Conferences in different dairy districts, Lectures, and Discussions and in other ways, efforts are continually being made to disseminate a more thorough knowledge of Dairy husbandry. Prizes to the value of upwards of £2,000 are annually offered for competition at the Dairy Show. It is difficult to over-estimate the importance and need of greater attention being paid to the Dairy industry. It is admitted that by improved modes of managing Milk and its products, the wealth obtained from the Milch Cows of the country could be increased most materially.”

From the foregoing paragraph it will be consequently seen that the Dairy Farmers' Association aims at doing for milk producers in the dairying industry generally what the Smithfield Club, by means of the Fat Stock Show in December, is intended to do for stock-feeders in the home fattening of cattle. The Show itself includes, besides the milking stock entered for competition, sections devoted to Cheese, Butter, Cream, Skim-milk, Bread and Scones, Honey, Roots, Table Poultry, Live Poultry, and Pigeons. There is also a series of Butter-making and Milking Competitions held during the

**Scope of the
Dairy Show.**

different days over which the fixture lasts: in addition there is an exhaustive display of dairying machinery and utensils on view, beside a special class in which medals for merit are awarded for “any new invention relating to the Dairy Industry, or one showing distinct or practical improvement, not eligible for competition in any other class and not previously exhibited at the Dairy Show.” From the twenty-three inventions exhibited under this section at the recent Show, it is of interest to note that silver

medals were awarded to a Swathe Turner and Tedder, to a hand-power Patent Cream Separator, and to a new kind of machine for the washing and Sterilising of large quantities of Milk Bottles and Milk Bottle cases; Bronze Medals were also awarded for a Delivery Churn and for a Bottle Filler and Capper.

The Section devoted to Dairy Cattle this year included 19 classes, two of which, however—those for Guernsey and Kerry Heifers—did not fill, and were consequently cancelled; three classes were also

Classes for one being allotted to Shorthorns, one to Jerseys,
Dairy Stock. and one to Bulls of any other Pure Breed. The
 nineteen classes devoted to milking cattle were

apportioned as follows:—

- Class (1.) Shorthorn Cows (Pedigree)
- „ (2.) Shorthorn Heifers not exceeding three years (Pedigree).
- „ (3.) Shorthorn Cows (non-Pedigree).
- „ (4.) Shorthorn Heifers not exceeding three years (non-Pedigree).
- „ (5.) Lincoln Red Cows (Pedigree).
- „ (6.) Lincoln Heifers (Pedigree).
- „ (7.) Jersey Cows (Pedigree).
- „ (8.) Jersey Heifers bred in the United Kingdom or Ireland (Pedigree).
- „ (9.) Jersey Heifers bred in the Channel Islands (Pedigree).
- „ (10.) Guernsey Cows (Pedigree).
- „ (12.) Red Polled Cows (Pedigree).
- „ (13.) Red Polled Heifers (Pedigree).
- „ (14.) Ayrshire Cows.
- „ (15.) South Devon Cows.
- „ (16.) Kerry Cows (Pedigree).
- „ (18.) Pair of Cows of any Breed or Cross in Milk.
- „ (19.) Single Cow of any Breed or Cross in Milk.

Eight different breeds of essentially deep milking cattle were here represented. As a rule the classes filled satisfactorily, and the competition for prize honours in each individual class as decided by inspection was extremely keen. The competition in each class was

of a dual nature: the first test was that of inspection, under which the animals were judged and placed in the order of merit for best conformation and appearance in the opinion of the officiating judges, and prizes were allotted under this test according to the placings: the further test was that based on the

Method of Judging:
(1) Inspection.

quantity and quality of milk yielded, and a similar number of prizes were allotted in most of the classes to this second or milking trial. According to a stipulation in the rules, no cow or heifer could be exhibited unless she had calved fourteen days before the opening of the Show, and in the case of animals entered for milking trials, a certificate verifying last date of calving was required to accompany the entry. In addition to these provisions, the following was the basis on which prizes in the milking trials of the different breeds were awarded:—

(2) Milking Trial.

“The points to be awarded in the Milking Trials will be as under:—

One point for every ten days since calving, deducting the first forty days, with a maximum of twelve points.

One point for every pound of milk, taking the average of two days' yield.

Twenty points for every pound of butter-fat produced.

Four points for every pound of 'solids other than fat.'

Deductions—Ten points each time the fat is below 3 per cent.;

Ten points each time the 'solids other than fat' fall below 8.5.

No Prize will be given to Cows in the Milking Trials which do not come up to the following Standard:—

					Points (for Cows).
Pedigree	Shorthorns	...	...	..	95
Lincolnshire	Red Shorthorns	...	...	...	100
Non-Pedigree	Shorthorns	...	...	...	110
Jerseys	...	...	...	...	95
Guernseys	...	...	...	...	85
Ayrshire	...	...	...	..	90
Red Polls	...	...	..	..	90
South Devons	...	...	...	..	100
Kerries	...	...	...	..	80

The Standard for Heifers in the Milking Trials will be two-thirds the points fixed for Cows.”

In further addition to the two foregoing competitions there was provided a third or butter test, in which all cows entered under the different breed classes were eligible to compete.

(3) Butter Test.

This really furnished a practical trial of the merits of the different breeds from the commercial aspect of the dairying business. The prizes under this test were awarded according to the following scale of points:—

“One point for every ounce of butter; one point for every completed ten days since calving, deducting the first forty days. Maximum allowance for period of lactation, 12 points.

"Fractions of ounces of butter, and incomplete periods of less than ten days, to be worked out in decimals, and added to the total points.

"In the case of cows obtaining the same number of points, the prize to be awarded to the cow that has been the longest time in milk.

"No prize or certificate to be given in the case of:—

(a) Cows under five years old failing to obtain 28 points; or in the case of Jerseys, 30 points.

(b) Cows five years old and over failing to obtain 32 points; or in the case of Jerseys, 35 points."

In examining closely the conditions attached to the milking trial and butter test, it will be noticed that the points in the former case are calculated on the weight of milk yielded in two days, and in the latter on the quantity of butter produced from one day's milking. The maximum number of points required from each breed, according to the above scale, discloses that the non-pedigree or ordinary cross-bred Shorthorn class are rated highest, and that the scale drops according to the capabilities of the different breeds until the Kerries are reached. The method of putting on a comparable basis the milk yielding capacity of cows, having regard to the length of time since calving, is explained by the rule governing this circumstance. It is apparent from this that cows are assumed to be in the full flush of milk for the first forty days after calving, and the addition of one point for every ten days after, until practically the five months' limit is reached, is taken as the means of establishing a fair basis of comparison.

On the opening day of the Show, judging of the different classes by inspection took place and the various prizes awarded. The milking trials were carried out morning and evening on the two following days, and the results of the butter produced from the total two days' milk yield subsequently announced. There is invariably considerable interest in watching how the animals who have taken the leading positions in the inspection test acquit themselves subsequently in the milking trials and butter tests. The inspection judge is not supposed in fixing his awards to give any consideration to what a cow, regardless of her appearance, may or may not be able to do as a milker or butter producer: the points of conformation as a typical breed representative are alone expected to influence him in deciding his placings. In this way the tendency to breed away from type is counteracted.

**Appearance
and
Performance.**

On the other hand, the subsequent tests of the milk pail and the butter scale reveal the utility merits, disclose the weak points, if any exist, in respect of quantity

and quality of milk produced, and register the standard of capacity which can be reached without any loss to the frame and constitution and without any serious falling away from the recognised breed characteristics. From these considerations it will be seen that a cow which secures a leading position not only in the limited competition among animals of her own breed, but in the wider butter test open to all other breeds, must possess really outstanding dairy-ing qualities.

In connection with the Shorthorn classes this season a noteworthy occurrence was (1) that the two cows placed first and second in the pedigree class on inspection occupied the same positions in the final butter test, (2) that these positions were reversed in the intermediate milk trials, (3) that the first and second prize cross-bred cows secured a higher number of points in the milking trials than their two pedigreed rivals, and indeed than any cow of any other breed, though by inspection they stood only third and highly commended respectively in their class, and (4) that the first prize pedigree shorthorn cow by inspection secured the highest place in the butter test, beating not only her cross-bred rival who stood above her in the milking trial, but the representatives of all the other milking breeds in competition. The following are the records of the four leading shorthorn cows both in the milking trials and butter tests:—

MILKING TRIALS: RESULTS.

	Weight of Milk for two days.				Actual weight of Fat.		Actual weight of Solids not fat.		Points.
	Morn.	Evg.	lb. oz.	lb. oz.	Morn.	Evg.	Morn.	Evg.	
Pedigree Cows :—									
Lady Higgle, (Second by Inspection)	64	4	54	2	1.46	1.36	2.9	2.36	136.7
Princess Ena, (First by Inspection).	53	3	53	5	1.43	1.55	2.38	2.30	134.5
Non-Pedigree Cows :—									
Lady Wilson, (Third by Inspection).	67	4	61	9	1.29	1.24	3.04	2.79	138.5
Milkmaid (H.C. by Inspection).	69	7	59	5	1.36	1.16	3.1	2.68	138.0
Matchless,	76	1	66	4	1.06	1.32	3.31	2.84	133.4

The comparative points made by the first and second winning cows of other breeds in this trial were:—Lincoln Red Shorthorns, 124.2 and 118.2; Jerseys, 111.6 and 107.4; Red Polls, 120.0 and 111.1; South Devons, 135.6 and 132.6; Kerries, 100.3 and 86.0.

The following table shows the result of the Butter Test, and includes, for comparison, not only the records of the four Shorthorns, but also the best records of some of the other breeds:—

BUTTER TESTS: RESULTS.

	Milk Yield in 24 hours.	Butter yield.	Ratio : viz., lbs. of Milk to lbs. of Butter.	Points for Butter.	Points for Lacta- tion.	Total Points.
Shorthorns :—	lb. oz.	lb. oz.				
Princess Ena, . . .	49 13	2 14½	17.13	46.50	2.90	49.40
Lady Higgle, . . .	58 0½	2 10½	21.96	41.25	—	42.25
Milkmaid, . . .	66 7	2 7½	27.08	39.25	—	39.25
Lady Wilson, . . .	63 7	2 0½	31.23	32.50	—	32.50
Matchless, . . .	69 6	2 2½	32.17	34.50	—	34.50
First Prize Jersey Cow :—						
Ghezireh, . . .	35 15	2 3	16.42	35.0	12.0	47.0
Lincoln Red Cow :—						
Fuschia, . . .	55 10	2 0½	27.59	32.25	9.30	41.55
(First in Class Milking Trial).						
Ayrshire Cow :—						
Dot, . . .	50 4	1 15	25.93	31.00	4.80	35.80

The record of the cross-bred shorthorn cow Matchless has been included in the two foregoing tables. It is of interest to examine it, inasmuch as this animal having the highest daily average yield of milk, 71.2 lbs., lost ten points, owing to her morning's milking being below the required standard of 3 per cent. This reduced her total points to 133.4, and thereby placed her other two rivals above her: in the butter test the lowness of her butter yield comparatively with her total milk yield gave her a wide butter ratio, but her total butter production for the day being greater, she scored more points than Lady Wilson, the cow which was first in the milk trial.

The class for pedigree Shorthorn Bulls of accredited milking strains, twelve months old or over, was governed by the following restrictions:—

“ No exhibitor will be allowed to make more than five entries in one class.

"No Bull is eligible for competition unless its dam has won a Prize or Commendation in the Milking Trials or a Certificate of Merit in the Butter Tests of this or any other approved Society.

"Note—Under the above conditions, Bulls from Dams that have won the Special Milking Prizes of the Shorthorn Society, or the Prizes or Certificates of the Dairy Shorthorn (Coates' Herd Book) Association, are eligible.

"Ages to be calculated to October 1st.

"These Classes being instituted to encourage the breeding of Bulls for Dairy purposes, the Prizes will be given solely to those animals exhibited in good stock-getting condition. All others will be disqualified."

Only seven entries were received in the class which might have been expected to attract stronger support. A partial explanation of this may be due to the fact that the restrictions regarding the proved milking capacity of the dam served to bar from competing many herds of deep milking Shorthorns that do not send representatives to Shows, although including many cows with very creditable records. Whether that be the case or not, it is difficult to see on what other lines a useful competition between bulls claiming inherited capacity for the specific object in view could be organised. It may be urged that the restrictions here enforced were too stringent and inconsistent with the care taken to uphold the breed characteristics displayed in the classes for cows. There does not

Shorthorn

Pedigree Bulls:

Milking Type.

appear to be any real grounds for apprehending injury to the Shorthorn as a breed type, even with such limitations enforced to further the object in view. Whether the provision of such a class may lead another year to a successful display of the animals looked for, it is difficult to conjecture; but it is equally difficult to imagine how Shorthorn Bulls, be they possessed of whatever milking record, can be judged by class inspection. A bull with a record of milk on either side of his pedigree can only be tested by the tried capabilities of the stock he leaves after him: his merits as an animal for producing cattle of heavy milking capacity cannot be decided by mere comparative inspection in the Show ring.

OFFICIAL DOCUMENTS.

I.—AGRICULTURE.

AGRICULTURAL SCHEMES.

The undermentioned schemes for 1910-1911 have been issued. Copies may be procured free of charge on application to the Offices of the Department:—

- Scheme No. 1 —For encouraging improvement in the breeds of Horses.
 „ No. 2.—For encouraging improvement in the breeds of Cattle.
 „ No. 3.—For encouraging improvement in the breeds of Swine.
 „ No. 4.—Loans for the purchase of Stallions.
 „ No. 5.—Loans for the purchase of Bulls.
 „ No. 6.—Subsidies to Agricultural Societies, etc.
 „ No. 7.—Prizes for Cottages and Small Farms.
 „ No. 8.—Flax.
 „ No. 9.—Instruction in Agriculture.
 „ No. 10.—Winter Agricultural Classes.
 „ No. 11.—Poultry Keeping.
 „ No. 12.—Tutorial Classes in Poultry Keeping.
 „ No. 13.—Buttermaking.
 „ No. 14.—Horticulture and Bees.

A. B. Memo. No. 1.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

BASIC SLAG.

During recent years there has been a considerable increase in the quantity of Basic Slag used in Ireland. As the season for the application of this manure is at hand, the attention of farmers may be directed towards the considerations which should guide them in its use and purchase.

There are large areas of second-class grazing land in this country which would be greatly improved by a dressing of Basic Slag. The best results are obtained on old pastures, composed mainly of coarse grasses, weeds and moss, and on low-lying black land which is deficient in lime.

The effects of the manure are most noticeable in the improvement of the "sole" or bottom, fine grasses and clovers often almost entirely replacing the inferior herbage which formerly composed the pasture.

Basic Slag should be applied before Christmas, preferably in November, and at the rate of from 6 to 10 cwt. per statute acre.

Farmers are warned against the purchase of low-grade inferior slags; some of the brands hitherto sold in Ireland have been practically worthless.

There is nothing in the appearance of Basic Slag which will give the slightest indication of its value. That depends on three things and *three only*. These are (1) the total percentage of phosphate of lime; (2) the percentage of that phosphate of lime which, under certain conditions, is soluble in a 2 per cent. solution of citric acid; and (3) the fineness of grinding. When asking for quotations, farmers should see that they are supplied with figures referring to each of these points, and when giving their orders they should insist on getting an invoice on which these figures are clearly stated as a guarantee. No slag should be used in which less than 80 per cent. of the phosphates are soluble, or which shows less than 80 per cent. of fineness.

For the guidance of farmers, however, it may be stated that a slag which is guaranteed to contain 34 per cent. of soluble phosphates is practically of equal value to a slag which is guaranteed to contain 42 per cent. total phosphates of which 80 per cent. are soluble in a 2 per cent. solution of citric acid, provided both are equally finely ground.

If farmers, after getting quotations for different slags, are in doubt as to which is the best value, they should, before giving their final orders, consult the Agricultural Instructor for their own County, who will always be ready to advise in such matters. Farmers should read the Department's leaflet No. 22, copies of which may be had free of charge and post free on application to the Secretary, Department of Agriculture and Technical Instruction, Dublin.

October, 1910.

WINTER AGRICULTURAL CLASSES, 1910-1911.

SYLLABUS OF THE COURSE.

Soils.—Brief sketch of origin and formation. Conditions influencing fertility. Soil improvement by draining, liming, etc.

Plant Life.—Study of a plant, and the functions of roots, stem and leaves; modification of these organs. Elements of plant food and their relative importance from an agricultural point of view. Conditions affecting the development of plants. Examination of the habits of growth and duration of the principal crops and weeds found on the farm, and the practical application of this knowledge.

Manures.—Farmyard manure: its storage and application. Organic and artificial manures. Composition, description and identification of artificial manures; their valuation, time and manner of application. Mixing manures. Special manures. Fertilisers and Feeding Stuffs Act.

Crops and Cropping.—Rotations. Cultivation. Seeding, Manuring and Harvesting of the principal farm crops. Forage and catch crops. Study of the commoner insect pests and fungoid diseases of crops.

Grasses and Clovers.—Characteristics, duration and adaptability for various purposes in farm practice. Identification of the different species and varieties.

Seeds.—Identification of farm seeds and the commoner impurities and adulterants. Germination and purity tests, how performed; the

inferences to be drawn therefrom. Change of seed. Grass seed mixtures. Weeds and Agricultural Seeds Act.

Live Stock.—Care and management of various classes of farm stock, with special reference to breeding, feeding and housing. Principal breeds of live stock; and their characteristics.

Feeding Stuffs.—Constituents of foods; their respective functions and value in animal nutrition. Valuation; manurial value. Description and uses of home grown and purchased feeding stuffs. Impurities and adulterants. Rations for various classes of farm stock. Methods of using foods.

Dairying.—Secretion of milk; composition; conditions influencing the quality and quantity of the milk yield. Care and treatment of milk for new milk trade or buttermaking. Cream ripening. Milk records. Respective merits and demerits of the several systems of dairying. Summer and winter dairying.

Mensuration and Land Surveying.—Rules for estimating the areas of the principal geometrical figures met with in chain surveying and farm calculations. Field Book; method of entering measurements; calculation and computation of areas. Practical work with the chain in the field. Plotting from the field book to given scales. Location of drains, etc., on the plans for future reference.

Farm Account Keeping.—Method of keeping a diary, cash book, and a record of credit transaction. Farm valuations and stock-taking. Balance sheets: their interpretation. Estimates of the cost of various farm operations, etc.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

MEMORANDUM.

MODIFICATIONS OF THE SCHEME OF AGRICULTURAL EXPERIMENTS.

No of
Experiment.

- VII. Turnip crop (Manurial Test *with* Farmyard Manure, Old Series).
15 tons of Farmyard Manure to be substituted for 10 tons in Plots 8 to 7 inclusive.
- IX. Turnip Crop (Manurial Test *with* Farmyard Manure, New Series).
15 tons of Farmyard Manure to be substituted for 10 tons in all plots.
- XI. Turnip Crop (Variety Test). “ Stirling Castle ” to be omitted.
- XVII. Potato Crop (Variety Test). “ White City ” to be substituted for “ Black Skerries.”
- XVIII. Potato Crop (Boxing Test). Plot 2 (seed boxed after January 31st) to be omitted.
- XXIII. Influence of Seed Mixtures in forming Pasture. At the discretion of Instructors the following mixture (Elliot's) may be tested on Plot 5, but only on poor thin land.

	Quantity of Seed per acre. lbs.
Cocksfoot (<i>Dactylis glomerata</i>)	10
Meadow Fescue (<i>Festuca pratensis</i>)	5
Tall Fescue (<i>Festuca elatior</i>)	4
Tall Oat-like Grass (<i>Avena elatior</i>)	3
Hard Fescue (<i>Festuca duriuscula</i>)	1
Rough-stalked Meadow Grass (<i>Poa trivialis</i>)	$\frac{1}{2}$
Smooth-stalked Meadow Grass (<i>Poa pratensis</i>)	1
Golden Oat Grass (<i>Avena flavescens</i>)	$\frac{1}{2}$
Italian Rye-Grass (<i>Lolium italicum</i>)	3
White Clover (<i>Trifolium repens</i>)	2
Alsike Clover (<i>Trifolium hybridum</i>)	1
Late-flowering Red Clover (<i>Tri prat. per. var.</i>)	2
Chicory (<i>Cichorium intybus</i>)	3
Burnet (<i>Poterium Sanguisorba</i>)	8
Sheep's Parsley (<i>Petroselinum sativum</i>)	1
Yarrow (<i>Achillea Millefolium</i>)	$\frac{1}{2}$

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XXIV. Suggested Liquid Manure Experiment on Hay.—Plot 1.
—No Manure Plot 2.—15 tons Liquid Manure.
Plot 3. —10 tons Farmyard Manure. Plot 4.—1 cwt.
Nitrate of Soda, 2 cwt. Superphosphate, 2 cwt.
Kainit.

September, 1910.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION-STREET, DUBLIN,
10th October, 1910.

No. 20122-10.

THE WARBLE FLY.

SIR,—With a view to discovering a method of preventing the occurrence of warbles in cattle, the Department have been conducting experiments during the past six years at their Agricultural Station, Ballyhaise, Co. Cavan. Much difference of opinion appears to exist at present in the minds of agriculturists and others as to the most suitable and successful means of eradicating the warble fly pest, and the Department consider that the results of their experiments in the matter at Ballyhaise should be brought under the notice of those interested. (Details of the experiments are to be found in the publications of the Department.)

Prior to the investigations of the past four years it was generally believed that the warble fly laid its eggs in summer on the backs of the cattle, and that out of these eggs maggots were hatched which worked their way through the skin, under which they gradually developed into the well-known warbles. The remedy then in vogue was based on this belief, and consisted in smearing the backs of the cattle in summer with train oil or other preparations considered likely to prevent the fly from laying its eggs on the animals. It was tested thoroughly and repeatedly by the Department at Ballyhaise, but in every instance the backs of the animals which had been smeared were found, in the following spring, to contain as many warbles as the

backs of those which had not been so treated. These experiments have shown that smearing in summer in order to prevent egg-laying appears to be useless.

As regards the manner of egg-laying and the method of the warble-maggot's entrance into cattle, continued investigations at Ballyhaise have, up to the present, yielded no definite result, and the difficulty of the problem has been intensified by the fact that Professor Carpenter of the Royal College of Science for Ireland, who has been conducting the experiments for the Department, has had no difficulty in finding young maggots embedded in the tissues of the gullets of young cattle slaughtered in October. But, however the maggots may gain entrance, there can be no doubt that in the *spring* they are all to be found under the skin on the backs of the cattle, and that if they are all destroyed *then* there could be no more flies, no more eggs, and, consequently, no more warbles.

The Department have, accordingly, for some years past directed the attention of farmers to the desirability of the systematic and regular destruction of warble-maggots in the spring. This course was strongly advocated at a recent meeting of the Council of Agriculture, and has been repeatedly referred to in the Department's reports on the subject. The method suggested in the Department's reports, viz., the squeezing out and crushing of the maggots as they ripen, though undoubtedly effective, has, however, been objected to by some, and as an alternative the smearing of the backs of the cattle with a preparation which will kill the maggots has been advocated. The Department have recently had an opportunity of observing at Baronrath, Straffan, County Kildare, the results of smearing to destroy the warbles, and they are satisfied that there is no danger of injury to the animal or to the beef by the decay of the dead maggot under the skin. The preparation successfully used by Mr. Kennedy of Baronrath, Straffan, in the demonstration referred to, consisted of Archangel Tar and Paraffin Oil in equal proportions.

Smearing of this nature, that is, for the purpose of destroying the warble-maggots, should be done mainly in the *spring*, and should not be confused with the summer smearing formerly recommended with a view to preventing the fly from laying its eggs on the backs of the cattle. As there are no warbles at present on the backs of cattle nothing can be done this season; but every effort should be made to have the warbles either squeezed out of the backs of affected animals or smeared *early next spring*.

The Department desire to draw the attention of the members of the several County Committees to the necessity, as matters stand, for destroying the maggots if the warble fly pest is to be successfully dealt with, and they recommend that Agricultural Instructors and Teachers should take every opportunity, at lectures, agricultural classes, etc., of bringing the matter under the notice of agriculturists and of all interested in the cattle industry.

In this connection the accompanying copy of a report (15350/10) furnished by the Itinerant Instructor in Agriculture for County Kildare, on tests carried out by him in 1909-10 in the killing of the pests, may prove of interest to your Committee.

I am,

Sir,

Your obedient Servant,

T. P. GILL,
Secretary.

The Secretary of each
County Committee of Agriculture.

(15350/10).

REPORT OF TESTS CARRIED OUT IN 1909 AND 1910 TO ASCERTAIN BEST METHOD OF KILLING WARBLER IN THE BACKS OF CATTLE.

The publication of Professor Carpenter's Report in Vols. VIII. and IX. of the *Journal* clearly established the fact that no dressing of a practical kind could be applied to the backs of cattle to *prevent* the egg-laying of the Warble Fly. It further showed that any practical steps for the combating of the pest must be confined to the warble while in situ in the host's back. In the same report the use of smears for killing the warble had also been tried, but without success. (Prof. Ostertag has recommended the removal of the warble by surgical means.)

Acting on these conclusions, a quick-acting hypodermic syringe was devised for injecting an insecticide into the warble abscess. The instrument was proved efficient by using ink as an injecting fluid and trying it on cattle just previous to slaughter; after flaying, the ink was found diffused in the connective tissue in the vicinity of the point of injection.

Early in 1909, trials were commenced with the syringe, various liquids as insecticides being tried.

For some time after the warble becomes visible as a protuberance on the host's back there is no visible hole communicating with the warble from the outside. The first external indication of the warble is the appearance of a tiny inflamed spot on the skin; this gradually enlarges and forms a scab, and later on when it falls off a dry waxlike substance is seen filling the warble hole. For about the next three weeks the hole remains quite small, while during the next three weeks or so, and up to the time the warble emerges, the hole gradually reaches a diameter of an eighth of an inch or maybe more.

In the early stages of the warble development it is easily killed by the injection into the abscess of certain insecticides. By injecting with the syringe at this stage, just when the scab is appearing, we have found the warble completely absorbed and healed up within about ten days.

With the opening of the warble pore in the hide of the host, the skin or chitinous covering of the warble rapidly hardens till at the emergent stage the toughness is sufficient to resist the weight of a man. In the earlier stages the needle of the syringe readily pierces the warble, later on and if the needle is not sharp the warble is pushed in front of and not pierced by the needle. For rapid healing it is desirable that the warble be pierced.

As an insecticidal injecting liquid a mixture of carbolic acid one part, turpentine 1 part, glycerine 1 part, and three parts of water, was found most effective. No scaling of the hair or scar is left by this liquid. Warbles appear to be most prevalent on yearlings and two-year-olds. As regards time of appearance, on a batch of cattle from near Killarney with its early and mild climate we found warbles in the beginning of February, whilst on the high grounds near the Wicklow hills we have got them in a similar stage of development as late as the middle of July.

With regard to the size and appearance of the warble tumour or protuberance on the beast's back, we have had evidence of a difference in this respect. In two cases we found strong store bullocks

presenting the appearance of being free of warbles, which on closer examination showed them to be badly infested—the warble being below the level of the beast's flesh and hide.

One of the most noticeable features of infested cattle is their comparative poorness of condition. Another is that all the warbles are not at the same stage of development. To the latter fact the chief difficulty of finding an efficacious smear is to be attributed. For the same reason the hypodermic syringe method has proved decidedly the most effective of destroying them. As an alternative method of killing warbles, smearing—on the lines advocated and practised by Mr. E. Kennedy, of Straffan—has been given equally careful trial, with fairly satisfactory results. Archangel tar was the chief ingredient of the various smear mixtures used. In two instances it was used alone, and in one case eight out of nine warbles were killed, in the other twelve out of fifteen, one application only being made.

Archangel tar and red precipitate—mercuric oxide—was tried with very promising results.

Archangel tar, mercuric oxide, and turpentine, formed a most effective smear, but showed a tendency to cause the hair to scale off.

A smear made of a mixture of archangel tar, turpentine and glycerine, though it was without effect on the hair and skin, was not nearly as effective as the mixture just above mentioned.

Lastly, archangel tar, thinned with a little paraffin oil, was tried, and out of nine warbles three of them were for some reason or other able to resist its lethal effects.

The results obtained convince one that smearing in the later stages of the warble's development is effective, though a double application of the smear will generally be necessary.

As a neat, efficient, and absolutely reliable method of destroying the warble in its earliest stages, the specially devised warble piercing syringe is, as these tests amply demonstrate, much to be preferred.

T. WADE.

II.—TECHNICAL INSTRUCTION.

PROGRAMME FOR TECHNICAL SCHOOLS AND SCIENCE AND ART SCHOOLS AND CLASSES.

I.—EXPLANATORY CIRCULAR.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND 1
UPPER MERRION-STREET, DUBLIN,
August, 1910.

SIR,—The Regulations for Technical Schools and Science and Art Schools and Classes, which were in operation during the Session 1909-1910, will continue in force, with one alteration only, during the Session 1910-11. Regulation 8 at page 9 of the Programme has been extended in order to permit of small schools adopting specialised courses of instruction covering a period of two years only. Particular attention is, however, directed to the Prefatory Note in which some important revisions have been made.

Teachers attending the ordinary classes conducted in Technical Schools under the terms of Section II. of this Programme will not be required to adopt courses of study as provided for in paragraph 19, and will be at liberty to attend instruction in any subject or subjects a knowledge of which would be of advantage to them in their work. Grants in such cases will not be paid, in any one year, for more than three subjects in respect of any one teacher, and the payment for any subject will be at the rate appropriate to the year of syllabus followed.

Attention is directed to the terms of Section II., 9, under which it will be necessary for the Managers of Schools to submit, by the 30th September, full particulars of the courses of instruction which must be designed in consideration of local industrial conditions. The main subjects of each course should be indicated.

In order to facilitate the work of inspection, and the checking of the particulars as to previous training, etc., necessary in the cases of all students in respect of whom it is proposed to claim grants, the Department will require, by the 5th December in each year, a complete list of such students showing the courses of study followed by each and their qualifications for admission to the courses. A form for this purpose will be issued in November.

The Department have found that the conditions in regard to the keeping of admission registers have not been generally complied with, and they desire it to be understood that Managers of Schools are expected to keep a systematic record of all students. A draft of an entrance form designed to meet the requirements of Section VII., 63, has been printed as Appendix C.

I am,

Sir,

Your obedient Servant,

T. P. GILL,
Secretary.

II.--OFFICIAL CALENDAR, 1910-11.

1910.

August-October :—Applications for the recognition of Schools and Classes to be submitted at least a fortnight before their opening.

Time-Tables of classes to be forwarded within 14 days after the first meeting of the classes.

September 30th :—Latest date for submitting lists of courses of instruction designed to meet needs of localities.

September 30th :—Latest date for submitting claims for grants in respect of the session 1909-10.

October 31st :—Latest date for submitting applications for the recognition of schools or classes for the session 1910-11.

December 1st :—Students must have been registered as in attendance at their courses on or before this date.

December 5th :—Latest date for sending in lists of students in respect of whom it is proposed to claim grants. (Form S. 296.).

1911.

January 19th :—Latest date for submitting application for school to be made a centre for local Science and Art Examinations.

March 18th :—Latest date for applying for examination papers for Local Science and Art Examinations.

March 30th :—Latest date for applying for admission to the Summer Courses for Teachers. (See Form S.41).

April 1st :—Latest date for submitting to Board of Education Works for National Competition, etc.

April 15th :—Latest date for submitting applications for Local Exhibitions, or for renewal of local Exhibitions. (Forms S.220 and S.224).

May 6th :—Local Science and Art Examinations begin.

Circular 73.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION-STREET, DUBLIN,
September, 1910

KILLARNEY SCHOOL OF HOUSEWIFERY.

SIR.—The Department have had under consideration the question of affording County Committees of Technical Instruction special facilities for the award of scholarships for girls, tenable at the Killarney School of Housewifery. The School is under the direct control of the Department, and has for its object the training of girls in such work as would fit them for domestic service or the care of a home.

The number of pupils who may be admitted to the School is strictly limited, and the Department will be in a position to allocate a few only of the available places to holders of Scholarships awarded under these conditions, but so far as accommodation will permit they will be prepared to award scholarships to girls resident in Rural Districts who have attended courses of Domestic Economy conducted by local Committees of Technical Instruction. It is intended that the privileges offered shall constitute a reward for good work done in the Committee's classes.

Scholars appointed under these conditions will be admitted to the School upon the payment of the reduced fees mentioned in the Conditions of Award printed overleaf.

I am,

Sir,

Your obedient Servant,

T. P. GILL,
Secretary.

To the Secretary
of the Committee named in the address.

CONDITIONS UNDER WHICH SCHOLARSHIPS WILL BE AWARDED.

Applicants for the scholarships must be resident in a rural district, and must have been in regular attendance at one of the Courses of Instruction in Domestic Economy conducted by the Committee of Technical Instruction for the county.

The scholars will be selected by the Department from the students nominated by County Technical Instruction Committees. Each

nomination must be accompanied by a report of the Domestic Economy Instructress upon the work of the applicant at the course of instruction attended.

Applicants for these Scholarships may be nominated for admission to the School on the 16th August, 1st November, 1st February or 15th April.

The Scholarships will be tenable for the full course of training which extends over about forty-six weeks.

A fee of £8, being one-half of the usual fee, will be payable by the County Committee in respect of each applicant nominated by them who is awarded a scholarship, and the parent or guardian of the scholar will be required to pay the entrance fee of £1.

Scholars will be required to conform to all the conditions set forth in the school Programme.

The Department reserve the right to determine a scholarship without notice upon being satisfied that its continuance is for any reason undesirable.

The decision of the Department in all questions arising in connection with the scholarships shall be final.

Form S. 108.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION-STREET, DUBLIN,

I.—SPECIAL EXAMINATIONS FOR TEACHERS' QUALIFICATIONS IN EXPERIMENTAL SCIENCE.

The Department will hold, in 1911, Special Examinations for Teachers' qualifications in Experimental Science. Each examination will be divided into two portions, the first a written test to be held on Saturday, the 13th May, from 11 a.m. to 2 p.m.; and the second a practical examination to be held subsequently on a date to be fixed by the Department, and which will be duly notified to candidates. Provisional recognition to give instruction in the First, Second, Third, or Fourth Year Syllabuses of the Department's Programme of Experimental Science for Day Secondary Schools, will be granted to those candidates who pass the examination.

The subjects of the Special Examinations will be:—

- (1) First Year Syllabus of the Preliminary Course.
- (2) Second Year Syllabus of the Preliminary Course.
- (3) Physics (Third Year Syllabus—General Physics and Heat).
- (4) Physics (Fourth Year Syllabus—Course A).
- (5) Physics (Fourth Year Syllabus—Course B).
- (6) Chemistry (Third Year Syllabus).
- (7) Chemistry (Fourth Year Syllabus).
- (8) Mechanical Science (Third Year Syllabus).
- (9) Mechanical Science (Fourth Year Syllabus).
- (10) Botany (Third Year Syllabus).
- (11) Botany (Fourth Year Syllabus).
- (12) Physiology and Hygiene (Third Year Syllabus).
- (13) Physiology and Hygiene (Fourth Year Syllabus).
- (14) Geology.

The examination in any subject will be open only to those Teachers in Secondary Schools who have received at least 100 hours' practical instruction in that subject within two calendar years previous to the date of the present examination. Before entering upon the course of instruction each Teacher must obtain, in writing, the Department's approval of the conditions under which such instruction is to be given.

Teachers who have made satisfactory attendance at the Summer Courses of Instruction conducted by the Department in 1909 and 1910, and who, as a result of the examination at the conclusion thereof, failed to secure a certificate, or obtained recognition to teach for one year only, will be admitted to the Special Examination in that subject without having to satisfy the Department as to attendance at further courses of instruction.

Candidates will not be permitted to sit for examination in more than one subject in any one year.

Should a sufficient number of applications for examination be received the Department will arrange to hold the written examination at Dublin, Belfast, Cork, Londonderry, Limerick, Waterford, and Galway, and, in very exceptional circumstances, other centres might be arranged for, provided that special written application is made by School Managers before the 28th February, 1911.

Application for admission to the examination must be made before the 28th February, 1911, on Form S. 118, copies of which may be obtained, after the 1st January, upon application to the offices of the Department.

II.—REGULATIONS UNDER WHICH THE DEPARTMENT ARE PREPARED TO RECOGNISE SPECIAL COURSES OF INSTRUCTION IN EXPERIMENTAL SCIENCE FOR TEACHERS IN DAY SECONDARY SCHOOLS.

The Instructor in charge of classes for Teachers must be specially qualified, and his qualifications must be approved of by the Department for the purposes of the Special Course of instruction.

The Laboratory must also be approved of by the Department for the purposes of the Special Course of instruction.

Special classes, conducted during the winter in a Technical School or central institution, other than Training Colleges, may be registered as Science classes, and grants earned according to the regulations and scale of payment set out in the Programme for Technical Schools and Science and Art Schools and Classes.

Attendance at theoretical instruction may not be taken into account when computing the 100 hours' practical instruction referred to in the third paragraph of Section 1 of this form.

Application for the recognition of special classes for Teachers must be made by letter, accompanied by detailed proposals upon Form S. 54. Attendance at lessons previous to the receipt of the Department's written approval of the arrangements may not be reckoned as part of the 100 hours' practical instruction.

Form S. 196.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION-STREET, DUBLIN.

**TRAINING OF TEACHERS OF CROCHET-WORK AND
SPRIGGING.**

The Department will, in September, 1910, award not more than three Scholarships, tenable at the Training College for Lace and Sprigging Teachers, Enniskillen, to girls having a satisfactory general education, and some proficiency in Crochet-work or Sprigging.

These Scholarships are granted to enable the holders to secure training as teachers of Crochet-work or Sprigging.

The Scholarships will be of the value of £25 each, and will be tenable for one year. The Department reserve the right to determine a Scholarship at any time upon being satisfied that its continuance is for any reason undesirable.

Each candidate for a Scholarship will be required to submit to the Department with the form of application, specimens of her work in either Crochet-work or Sprigging.

Should the work submitted be regarded as of a satisfactory standard, the candidate will be admitted to an examination which will consist of simple tests in English, Arithmetic, Drawing, and Crochet-work or Sprigging.

The Scholarship will be awarded as the result of the examination. (Not more than one Scholarship will be awarded in the case of candidates from any one County.)

The examination will be held at the Metropolitan School of Art, Dublin, and at the Technical School, Enniskillen, on the following dates:—

Dublin: English, Arithmetic and Drawing, on Wednesday, 21st September. Crochet-work or Sprigging, on Thursday, 22nd September.

Enniskillen: Crochet-work or Sprigging, on Tuesday, 20th September. English, Arithmetic and Drawing, on Wednesday, 21st September.

Candidates will be required to defray their own expenses in attending the examination.

Candidates must be at least 20 years of age on the 1st September, 1910, and must have been born in Ireland or have resided in the country for three years immediately preceding that date.

Two Certificates of good character will be required from all applicants, and selected candidates will be required to produce a medical certificate of health and an authenticated copy of certificate of birth.

The decision of the Department in regard to the selection of candidates or to any other question arising out of these Scholarships will be final.

Applicants must fill in and return, addressed to the Secretary of the Department, Form S. 197, copies of which may be had on application, together with specimens of work in Crochet or Sprigging. (Two specimens of finished work, and two specimens of work in progress should be furnished.)

Only those applications received at the Offices of the Department by 12 noon on Monday, September 12th, can be taken into consideration.

Form S. 255.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION-STREET, DUBLIN.

EXAMINATION IN PRINCIPLES, METHODS AND HISTORY OF EDUCATION.

An examination in the Principles, Methods, and History of Education, with special reference to Science Teaching, will be held on Saturday, the 24th June, 1911. The examination will be held in Dublin, and also, if a sufficient number of applications are received, in Belfast and Cork.

The test in this subject is provided for persons who have been provisionally recognised as Teachers of Experimental Science under the conditions of §§ I. (1) and II. (1) of the Department's Circular Letter (No. 23) of May, 1903, and the Department will not be prepared to admit applicants who are not qualified for such provisional recognition.

Applications for admission to the examination should be submitted not later than the 24th May, on Form S.250, copies of which may be obtained after the 1st January from the offices of the Department.

A fee will not be charged for admission to the examination.

SYLLABUS OF EXAMINATION.

The history and criticism of opinion upon the Ends of Education and of the Curriculum as the means of attaining those ends, with special reference to the development and present state of instruction in Science.

The Endowment of the child as the basis of the educational process. The relation of Development to Endowment.

The main features of general development; the inter-relation of the Intellectual, Emotional and Active factors.

The chief stages in general development: their characteristics and normal order of appearance.

The most important differences between individual children with regard to the foregoing.

The general characteristics of the Curriculum and Methods of instruction in Science as determined by the laws of general development: the correlation of Science with other subjects of the curriculum.

The nature and relations of the mental functions involved in the acquisition of Knowledge. Individual differences with regard to these, especially to the characteristics of Attention and Imagery. The main principles of Exposition.

The general nature of the Inductive and Deductive processes: their relations to one another in the development of knowledge; their characteristics at different stages of general development.

The methodology of instruction in Science as determined by the laws of development of Knowledge; the functions and relations of laboratory work and class teaching.

The critical study of the history of a special branch of Science so far as it bears upon the teaching of the subject.

The general principles of Class-management: Order and Discipline: class-management in the laboratory.

The use of note-books and text-books in Science teaching: methods of recording and treating observational data. Correlation of Science teaching with instruction in English and Drawing.

The construction and use of pictorial illustrations, diagrams and models: the construction of apparatus.

Supplementary means of instruction: records of daily or seasonal observations, the school excursion, school gardens and museums.

Laboratory organisation and management.

The following books may be consulted:—

Raymont: "The Principles of Education." (Longmans, Green & Co.)

Monroe: "A Brief Course in the History of Education." (Macmillan & Co., Ltd.)

McDougall: "An Introduction to Social Psychology" [Section I.]. (Methuen & Co.)

Adams: "The Herbartian Psychology applied to Education." (D. C. Heath & Co.)

Adams: "Exposition and Illustration in Teaching." (Macmillan & Co., Ltd.)

Adamson: "The Practice of Instruction" [Part I. and Part II., Section VI.]. (National Society's Depository.)

Jevons: "The Principles of Science." (Macmillan & Co., Ltd.)

Armstrong: "The Teaching of Scientific Method." (Macmillan & Co., Ltd.)

One of the following:—

Mach: "The Science of Mechanics." (Kegan Paul, Trench, Trübner & Co., Ltd.)

Pearson: "The Grammar of Science." (A. & C. Black.)

Thompson (J. A.): "The Science of Life." (Blackie & Son, Ltd.)

III.—FOOD AND DRUGS.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

BUTTER AND MARGARINE ACT, 1907. (Sections 8 and 14 (1).)

LIST OF NAMES APPROVED BY THE DEPARTMENT FOR USE IN CONNECTION WITH MARGARINE.

(FIFTH LIST.)

NOTE—Approval by the Department authorises the use of the name in Ireland only. Approval does not confer on any person any exclusive right to the use of the name, nor authorise its use by any person not entitled to use it.

Coco
Dreadnought
Glow
Golden Flower
Golden Sail
Needee
Plantall
Red Briar
Royal Thistle
Silver Slaney
Tit-Bits
Vee-Dee

Offices, 4 Upper Merrion Street,
Dublin, 30th June, 1910.

IV.—TRANSIT AND MARKETS.

THE AGRICULTURE AND TECHNICAL INSTRUCTION (IRE- LAND) ACT, 1899, AND THE MARKETS AND FAIRS (WEIGHING OF CATTLE) ACTS, 1887 AND 1891.

1. The Agriculture and Technical Instruction (Ireland) Act, 1899, and the Markets and Fairs (Weighing of Cattle) Acts, 1887 and 1891, require that the market authority (*) of every market or fair to which the Markets and Fairs (Weighing of Cattle) Act, 1887, for the time being applies, provide and maintain to the satisfaction of the Department of Agriculture and Technical Instruction for Ireland sufficient and suitable accommodation for weighing cattle.

2. The Acts also provide that an auctioneer shall not, unless exempted by order of the Department from the requirements in this behalf, sell cattle at any mart where cattle are habitually or periodically sold unless there are provided at that mart similar facilities for weighing cattle as are required in the case of cattle sold at a market or fair to which the Markets and Fairs (Weighing of Cattle) Act, 1887, applies.

(1) Section 2 of the Markets and Fairs (Weighing of Cattle) Act, 1887, enacts that—

“This Act, save as is hereinafter provided, shall apply to all markets and fairs in which tolls are for the time being authorized to be taken and actually are taken in respect of cattle by any company, corporation, or person; and every such company, corporation, or person is in this Act called ‘the Market Authority.’”

3. It is desirable that previous to providing accommodation for weighing cattle, Market Authorities should inform the Department of the nature and extent of the accommodation which it is proposed to provide, and such information should be accompanied by plans, drawn to scale, indicating the size, description, and general arrangement of the weighing machines and any enclosures, in connection with the machines, for penning cattle previous to and after being weighed. Market Authorities will then be informed, so far as it is possible from the information thus supplied, whether the proposed accommodation appears to be sufficient and suitable.

4. The weighing machine should be provided with a cage or pen for confining cattle upon the weighing platform when being weighed, and the platform of the machine should in no case be less than 8 feet long by 3 feet wide within the cage or pen. Frequently it may be considered necessary that machines having platforms of larger dimensions should be provided.

5. The cage or pen should rest entirely on and be firmly fixed to the platform of the weighing machine when it is used for weighing cattle, and should be so constructed as to satisfy the following conditions, viz.:—

(a) That when the cage or pen is fixed in position for weighing cattle, and the entrance and exit gates or doors thereof are closed, the upper edge of the sides and ends of the cage or pen shall not at any point be less than five feet above the weighing platform.

(b) That the sides and ends of the cage or pen be close-sheeted, or the bars of which the cage may be constructed be placed at close intervals, or other suitable means be adopted, to guard against the possibility of any animal relieving the weighing platform of a portion of its weight or injuring itself when confined thereon by protruding its head, feet, or legs through apertures in or under the sides or ends of the cage or pen, or endeavouring to jump out of or escape therefrom.

(c) That the cage or pen be strong enough to resist the pressure of the heaviest stock that are likely to be weighed.

(d) That cattle may be driven into and out of it with safety and expedition.

(e) The entrance and exit doors or gates of the cage or pen should open to its full width, and should be secured on the outside by bolts or other suitable fastenings so fitted as to provide effectually against the lower portions of such doors or gates being thrust outwards by cattle in such a manner as to permit the hoof of a beast to project beyond the weighing platform.

6. The weighing platform of the machine should not be constructed of wood or of any material which readily absorbs moisture, and the upper surface of the platform should be roughened, or so constructed as to guard against cattle slipping thereon.

7. The Steelyard, or Index Lever, should indicate weights in hundred-weights, quarters and pounds avoirdupois, and should be so placed and exposed to public view, that those who are immediately interested in the weighing of any lot of cattle may, with facility, observe that the machine is adjusted before each animal or lot of animals is placed upon it; may read the weight indicated, from a position from which they may also conveniently observe the cage or pen on the weighing machine platform; and may see for

themselves that the weight recorded on the ticket specifying the true weight of the cattle weighed corresponds with the weight indicated by the weighing machine. The Steelyard, or Index Lever, if placed within an office, box, or other enclosed structure, should be placed parallel to and within one foot of a window, so that the weight indicated thereon may be read with facility by those standing outside; to conform to this requirement the scale by which the weight is indicated should be graduated on each side of the Index Lever. The graduations of the scale on the Index Lever indicating the weights recorded, and the figures indicating the graduations, should be clearly marked, so that they may be easily read and understood by the public. Weighing machines provided with loose weights will not be approved.

8. The lever bearings and knife-edged centres should be protected so as to prevent the admission of mud or dirt, and proper provision should be made for draining the pit, and for access thereto.

9. The weighing machine should be so constructed that it may be tested by the Local Inspector of Weights and Measures, as provided by Section 4 of the Markets and Fairs (Weighing of Cattle) Act, 1887.

10. In cases in which accommodation for penning cattle, before and after being weighed, should be provided in immediate connection with the weighing machine, each such pen should, if the available space permits, enclose an area of not less than two hundred square feet. Each pen for receiving cattle prior to weighing should have a separate entrance, and should open into a fenced-in passage leading to the platform of the weighing machine.

A bar or gate or other suitable structure should be so placed in the passage along which cattle should pass to the weighing machine, that when necessary it may be used to prevent such cattle pressing against the gates or doors of the cage or pen on the platform of the weighing machine, and thereby causing difficulty and delay in opening such doors or gates.

In providing penning accommodation due regard should be had to the possible necessity of extending such accommodation in the future.

11. A suitable fence or other effectual means should be provided to guard against the weighing machine being interfered or tampered with by any person during the operation of weighing.

12. The weighing machine should be placed in as convenient a position as circumstances permit for the accommodation of buyers and sellers of cattle.

13. The weighing machine should not be used for any purpose other than weighing cattle during the continuance of the cattle fair or market in respect of which it has been provided.

14. Market Authorities are not recommended to provide dial indicating weighing machines, and such machines should not be provided except with the special sanction of the Department.

15. For the purposes of the Markets and Fairs (Weighing of Cattle) Acts, the word "cattle" includes ram, ewe, wether, lamb, and swine.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
DUBLIN.

July, 1910.

V.—VETERINARY.

ALPHABETICAL LIST OF SHEEP DIPS

Which have been approved up to 30th June, 1910, by the Department of Agriculture and Technical Instruction for Ireland, under the Sheep Scab (Ireland) Order of 1905, in addition to those specified in the Second Schedule to that Order.

NOTE.—As it is by the manufacturers or proprietors that the names given to Dips have been selected, no responsibility is assumed by the Department for the use of the term "Non-Poisonous" in the title of any Dip.

Name of Dip	Name and Address of Manufacturer or Proprietor.	Proportion of dilution in water approved for each dip when used for Sheep Scab.	
		Quantity of Dip.	Number of Gallons of water.
Albion Powder Dip,	P. N. White, Chemist, Sligo,	1 lb. 14 ozs. (1 packet.)	20
Antiseptic Dip,	The North of Ireland Chemical Co., Ltd., Belfast. Wm. Bailey and Son, Horsley Fields Works, Wolverhampton. The Bankhall Chemical Company, Bankhall Bridge, Canada Dock, Liverpool.	1 gallon,	50
Do (hot water quality), ..		1 gallon,	20
Bailey's Powder Sheep Dip, ..		2 lbs.	25
Bailey's Fluid (Non-Poisonous) Sheep Dip and Cattle Wash		1 gallon,	50
Bankhall Sheep Dip,		1 part,	50 parts.
* Battle's Fluid Sheep Dip, ..	Battle, Maltby and Powner, Victoria Chemical Works, Lincoln.	1 gallon,	60
Battle's Powder Dip,		1 lb. 14 ozs.	20
Battle's Paste Dip, Non-Poisonous.		10 lbs.	50
Battle's Paste Dip, Poisonous, ..		10 lbs.	50
Bell and Riddle's Prepared Cresolene.	Bell and Riddle Analytical Laboratory, Hexham.	1 gallon,	40
Bell and Riddle's Special Non-Arsenical Sheep Dip		10 lbs.	50
Bell and Riddle's Improved Powder Dip and Fly Powder		2½ lbs.	25½
Bell and Riddle's Soluble Oil Sheep and Lamb Dipping Composition		10 lbs.	50
Bell and Riddle's "Triol" Dip.	Messrs C. Zimmermann and Company, 9 and 10, St. Mary-at-Hill, London, E.C.	1 gallon,	90
Beta-Lysol Sheep Dip,		1 gallon,	50
Bigg's "Glenovis,"	Thomas Bigg, 11½ Great Dover Street, London, S.E. 1.	2 lbs.	16
Bigg's Paste Dip,		17 lbs.	100
Brittain's Powder Dip,		1 lb. 14 ozs (1 packet.)	20
Broderick's Powder Dip,	J. J. Broderick, Chemist, Fermoy.	1 lb. 14 ozs. (1 packet.)	20
Calvert's Carbolic Sheep Wash, ..	F. C. Calvert and Co., Bradford, Manchester.	1 gallon,	100
Celtic Combined Fluid Dip,	Messrs. Ewing and Robertson, Empire Works, Carntyne, Glasgow.	1 gallon,	65
Celtic "Fly" Dip,		5 lbs.	23
Celtic Sheep Dip, Winter Quality,		1 gallon,	40
Celtic Sheep Dip, Summer Quality.		1 gallon,	40
Cheviot Carbolic Fluid Sheep Dip,		1 gallon,	75
Cheviot Carbolic Paste Sheep Dip.		1 lb.	5
Cheviot Fluid Sheep Dip,	Messrs. Burn and Gillies, Highgate Chemical Works, Tweedmouth, Berwick-on-Tweed, England.	1 gallon,	75
Cheviot Concentrated Fluid Sheep Dip.		1 gallon,	50
Cheviot Paste Sheep Dip,		1 lb.	5
Cheviot Powder Sheep Dip,		2 lbs.	18
Cheviot Fly Paste Sheep Dip, ..		1 lb.	5
Clements' Sheep Dipping Fluid,	A. Clements, Chemist and Druggist, The Medical Hall, Cooteshill.	1 gallon,	70

* The proportion of dilution shown in the case of this dip is that which the Department have now approved as regards that particular preparation in substitution for a different proportion approved some time ago.

ALPHABETICAL LIST OF SHEEP DIPS—*continued.*

Name of Dip	Name and Address of Manufacturer or Proprietor.	Proportion of dilution in water approved for each dip when used for Sheep Scab.	
		Quantity of Dip	Number of Gallons of water
"Climax" Poisonous Powder Sheep Dip	The Bounadry Chemical Co., Limited, Railway Arches, Lutob-street, Laverpool	1 lb	10
"Climax" Liquid Non-Poisonous Sheep Dip		1 gallon	0
Conway's Powder Dip, .		1 lb 14 ozs (1 packet)	20
Cooke's Powder Dip,	William Cooke, The Medical Hall, Gorey	1 lb 14 ozs (1 packet)	20
Cooper's Powder Dip,	R. H. Cooper, Medical Hall, Wexford	1 lb 14 ozs (1 packet)	20
Cooper's "Albyn" Fluid Sheep Dip,	Messrs W Cooper and Nephews Chemical Works, Berkhamsted	1 gallon,	80
Cooper's Sheep Dipping Powder		30 ozs	20
Cooper's Fluid		1 gallon,	80
Cooper's "Albyn" Paste Dip	Joseph Dee and Sons, 5 Cross-street, Manchester	1 lb	5
"Delight" Sheep Dip, ..		1 part	100 parts
Devlin's Powder Dip, .	P. J. Devlin, L.P.S.I., Chemist, Thurles	1 lb 14 ozs (1 packet)	20
Donald's Powder Sheep Dip (Poison)	Donald and Co., New Scone, Perth	1 lb 14 ozs (1 packet)	20
Doyle's Powder Dip, .	W. Doyle and Co., Registered Druggists, Athlone	1 lb 14 ozs (1 packet)	20
Doyle Brothers' Powder Dip, ..	Doyle Brothers, Registered Druggists, Athy	1 lb 14 ozs (1 packet)	20
Ewe Ram (Non-Poisonous), Sheep Dip	Messrs Reid and Robertson, 68 Hyde-park-street, Glasgow	25 lbs	80
Ewe Ram (Poisonous) Sheep Dip		25 lbs	80
"Elswick" Sheep Dip, .	Davis, Goodall and Company, Newcastle-on Tyne	1 gallon,	60
"F. B. Sheep Dip," ..	Messrs Fenner Brothers, Little Island Chemical Works, Cork	1 part,	50 parts
Farmers' Sheep Dip (No. 1, 2, 3)	Hall, Dunbar and Company, St. Ninian's Works, Leith	1½ gallons	80
Fielding's Liquid Sheep Dip, ..	P. J. Fielding, F.C.S., 66 Patrick-street, Cork	1 pint,	10
Germkil Sheep Dip, ..	The Apothecaries' Hall of Dublin, 40 Mary-street, Dublin	1 part,	60 parts
Goldon's Powder Dip, .	Goldon and Co., Medical Hall, Bury	1 lb 14 ozs (1 packet)	20
"Golden Magnet" Sheep Dipping Powder	Cope Brothers and Co., Ltd., Lord Nelson-street, Liverpool	5 lbs	10
Gorry's Fluid Dip, .	Joseph Gorry, 54 South Main-street, Naas	1 gallon	60
Gorry's Powder Dip,		30 ozs	20
Grindley's "Pioneer Brand" Sheep Dip	Grindley and Co., Ltd., Poplar, London, E.	1 gallon,	70
Harescough's Carbolic and Arsenical Paste Dip (Poison)	Messrs B. B. Harescough and Co., Ltd. Carlton Chemical Works, Skipton.	10 lbs	10
Harescough's Liquid Creosote Sheep Dip		1 gallon,	40
Hadden's Powder Dip, ..	Hadden's Medical Hall, Wexford, New Ross, and Enniscorthy	1 lb 14 ozs (1 packet)	20
Hamilton's Powder Sheep Dip,	W. J. Hamilton, Druggist, Gortin	1 lb 14 ozs (1 packet)	17
Harrington's Specific Sheep Dip	Cork Chemical and Drug Co., Ltd., Cork	1½ lbs	13
"Harvey's Improved Sheep Dip"	J. W. Harvey, L.P.S.I., 31 Great George's-street, Cork	1 gallon,	70

* The proportion of dilution shown in the case of this dip is that which the Department have now approved as regards that particular preparation in substitution for a different proportion approved some time ago.

ALPHABETICAL LIST OF SHEEP DIPS—*continued.*

Name of Dip.	Name and Address of Manufacturer or Proprietor.	Proportion of dilution in water approved for each dip when used for Sheep Scab.	
		Quantity of Dip.	Number of Gallons of water
* Hayward's Yellow Paste Dip.	Messrs. Tomlinson and Hayward, Ltd., Lincoln.	1 lb.	10
Hayward's Combined Glycerine Sheep Dip.		1 lb.	5
Hayward's Glycerine Dip (Non-Poisonous Paste or Bloom).		1 lb.	5
Hayward's Liquid (or Fluid) Dip.		1 gallon.	60
Hayward's "Glycerine" Dip.		1 lb.	4
Hayward's "Glycerine Cake" Dip.		1 lb.	5
Healy's Powder Dip.	Luke J. Healy, Chemist and Druggist, Drogheda.	1 lb. 14 ozs.	20
Rewthorn's Wool Improving Sheep Dip.	F. Hewthorn and Co., Ltd., 70 Finsbury-pavement, London, E.C.	(1 packet). 1 gallon.	48
"Highland" Fluid Sheep Dip	Messrs. Alex. Robertson and Sons, Argyle Chemical Works, Oban, N.B.	1 gallon.	75
"Highland" Powder Sheep Dip.		1 lb. 14 ozs. (1 packet.)	17
"Ialine" Sheep Dip.		1 gallon.	70
Jackson's Fluid Sheep Dip	Ethelbert, Jackson and Company, Harbour-road, Swansea.	1 gallon.	50
Jackson's Powder Sheep Dip.		29 ozs. (1 packet.)	16
		when used in a hand bath	20
		29 ozs. (1 packet.)	20
		when used in a swim bath	60
Jeyes' Non-Poisonous Sheep Dip,	Jeyes' Sanitary Compounds Co., Ltd., 64 Cannon-street, London, E.C.	1 gallon.	60
"John O'Gaunt" Paste Dip, (No. 3).	Maudsley and Son, The Arcade, Lancaster.	10 lbs.	30
Kennedy's Sheep Dipping Powder.	W. P. Kennedy, Borris, Co. Carlow.	30½ ozs. (1 packet.)	15
Kiloh's Non-Poisonous Liquid Sheep Dip.	Messrs. Kiloh and Co., Ltd., Cork.	1 part,	50 parts
Kiloh's Sheep Dipping Composition.		4 lbs.	13
Kiloh's Sheep Dipping Powder		1½ lbs.	13
Lawes' Fluid Dip.	Lawes' Chemical Co., Ltd., 59 Mark-lane, London, E.C.	1 gallon.	40
Lawes' Kalyptos Sheep Dip.		5 lbs.	30
* Lawes' Paste Dip, Poisonous.		1 lb.	8
* Lawes' Paste Dip, Non-Poisonous.		1 lb.	8
Lawes' Powder Dip.		2 lbs.	20
Lawrie's Powder Dip.	Crawford, Cree and Lawries, Ltd., Glasgow.	1 lb. 14 ozs. (1 packet.)	20
Little's Improved Fluid Dip.	Morris, Little and Son, Ltd., Doncaster.	1 gallon.	75
* Little's Non-Poisonous Cake Sheep Dip.		1 lb.	5
* Little's Non-Poisonous Fluid Sheep Dip.		1 gallon.	50
* Little's Non-Poisonous Paste Sheep Dip.		1 lb.	5
* Little's Poisonous Liquid Dip.		1 gallon.	60
* Little's Poisonous Powder Sheep Dip.		39 ozs.	20
Little's Poisonous Fly Paste Sheep Dip.		1 lb.	8
"Long's Specific,"	Messrs. Corry and Co., Ltd., 13 and 15 Finsbury-street, London, E.C.	1 gallon.	5

* The proportion of dilution shown in the case of this dip is that which the Department have now approved as regards that particular preparation in substitution for a different proportion approved some time ago.

ALPHABETICAL LIST OF SHEEP DIPS—*continued.*

Name of Dip.	Name and Address of Manufacturer or Proprietor.	Proportion of dilution in water approved for each dip when used for Sheep Scab	
		Quantity of Dip	Number of Gallons of water.
MacMahon's Powder Sheep Dip.	N. B. MacMahon, Killiter, Co. Tyrone.	1 lb 14 ozs (1 packet).	17
Magee's Royal Meath Powder Sheep Dip.	E. P. Magee, Veterinary Chemist, Kells.	1 lb. 14 ozs. (1 packet)	17
Mallen's Carbolic Paste Dip, ..	Mallen and Co., 89 Upper Dorset-street, and Blesington-lane, Dublin John Martin, 50 West Scotland street, Glasgow.	1 lb	2½
Mallen's Powder Dip, ..		5 lbs.	44
Martin's Hellebore and Carbolic Sheep Dip.		1 lb.	3
McDougall's Border Paste Dip (Poisonous).		1 lb.	6
McDougall's Yellow Powder Dip.	McDougall Bros., 68 Port-street, Manchester.	2 lbs. net. packet.	20
McDougall's Improved Concentrated Liquid Sheep Dip		1 part.	100 parts
McDougall's Grease Sheep Dip		3 lbs.	5
McDougall's Sheep Dip (Paste or Hot Water Quality).		1 gallon,	50
McDougall's Sheep Dip (Cakes and Blocks), Hot Water Quality (Patented)	McGee's Powder Dip (Poison), ..	1 part,	50 parts
McDougall's Arsenic Sulphur Dip.		5 lbs.	40
McDougall's Liquid Sheep Dip (Cold Water Quality)		1 gallon,	80
McGee's Powder Dip (Poison), ..		1 lb. 14 ozs (1 packet)	20
McGuire's Liquid Non-Poisonous Sheep Dip.	Hugh McGuire, Quay, Wexford	1 gallon,	40
McHugh's Powder Dip. ..	J. J. McHugh. Medical Hall, Athy.	1 lb 14 ozs (1 packet).	20
McHugh's Fluid Dip. ..		1 gallon.	60
McHugh's Paste Dip. Non-Poisonous		10 lbs	50
McLeod's Non-Poisonous Sheep Dip		10 lbs	25
McLeod's "Universal" or Poisonous Sheep Dip.	F. H. McLeod and Sons, 61 Bishop-street, Anderston, Glasgow.	10 lbs.	50
Miller's Sheep Dip. ..	R. Miller and Co., Clydesdale Works 50 Victoria-road, Glasgow.	1 part,	80 parts
Murtagh's Powder Dip, ..	Murtagh's Medical Hall, 37 Shop-street, Drogheda.	1 lb. 14 ozs (1 packet)	20
Mykrol Fluid Dip, ..	The Mykrol Company, Queen's Ferry, Flintshire.	1 part,	40 parts
Mykrol Powder Dip, ..		2 lbs	18
"Necrotine" Sheep Dip, ..	The British Nicotine Company, Ltd., Bootle, Liverpool.	(1 packet.) 1 part,	32 parts
"Nicotina" Sheep Dip, ..	Messrs Corry and Co., Limited, 13 and 15 Finsbury-street, London, E.C.	1 gallon,	50
"Niquas" Sheep Dip.	Messrs. Alex. Robertson and Sons, Argyle Chemical Works, Oban, N.B.	1 gallon,	35
Non-Poisonous Paste "Highland" Sheep Dip.		1 lb.	5
Non-Poisonous Sheep Dip, ..	Messrs. Kerr, Lang, and Jackson, Ltd., Londonderry.	1 lb.	5
Odams' Powder Dip, ..	Odams' Manure and Chemical Co., Ltd., 109 Fenchurch-street, London.	2 lbs.	20
Odams' Fluid Dip, ..		1 part,	50 parts
"Ovizal" Fluid Sheep Dip, ..	Hay, Steven and Co., Kelvin-dock Chemical Works, Maryhill, near Glasgow.	1 gallon.	100
"Ovizal" Paste Dip, ..		1 lb.	5
"Ovizal" Powder Dip, ..		6 packets of dip (each containing 1 lb. 14 ozs. of powder).	100
Pettifer's Sheep Dipping Composition (Paste).	Messrs. Stephen Pettifer and Sons, Crudwell Chemical Establishment, Malmesbury, Wilts.	1½ lbs.	15
Pettifer Powder Dip, ..		1 lb. 14 ozs.	20
Poisonous Paste "Highland" Sheep Dip.	Messrs. Alex. Robertson and Sons, Argyle Chemical Works, Oban, N.B.	1 lb.	5

ALPHABETICAL LIST OF SHEEP DIPS—*continued.*

Name of Dip.	Name and Address of Manufacturer or Proprietor.	Proportion of dilution in water approved for each dip when used for Sheep Scab	
		Quantity of Dip	Number of Gallons of water.
Puritas Sheep Dip (Cold Water Quality).	Puritas Disinfectants Co., Ltd., Evington Valley-road, Leicester	1 part,	100 parts
* Puritas Sheep Dipping Powder.		2 lbs.	20
Puritas Sheep Dipping Fluid,		1 part,	50 parts
Puritas Concentrated Liquid Sheep Dip.		1 part,	80 parts
Puritas Golden Paste Sheep Dip.		5 lbs.	40
Puritas Sheep Dip (Hot Water Quality).	Quibell Brothers, Limited, New- ark, England.	1 part,	50 parts
Puritas Dressing Dip for Sheep,		7 lbs.	40
Puritas Fly Sheep Dip,		5 lbs.	40
Quibell's Combined Paste Dip (Arsenical and Carbolic).		1 lb.	5
Quibell's Improved (Non-poisonous) Liquid Sheep Dip.		1 gallon,	100
Quibell's Liquid Sheep Dip,		1 gallon,	40
Quibell's Non-Poisonous Paste or Cake Dip		5 lbs.	25
Quibell's Powder Sheep Dip,		3½ ozs.	20
Quibell's Special (Non-Poisonous) Liquid Sheep Dip.		1 gallon,	85
Robinsons' Sheep Dip,	Robinson Brothers, Ltd., West Bromwich, Staffordshire.	1 part,	80 parts
"Rome's Sheep Bath,"	H. F. Rome, Manufacturing Chemist, 1 and 3 Solway- street, Annan, N.B.	26 ozs.	42
Santifer Sanitary Fluid,	Messrs. Stephen Pettifer and Sons, Crudwell Chemical Establishment, Malmesbury, Wilts.	1 gallon,	60
Scottish Chemical Company's Liquid Dip	The Scottish Chemical Co., Ltd., 43 Wellington-street, Greenock.	1½ gallons,	100
Scottish Chemical Company's Paste Dip.		15 lbs.	100
Scott's Sheep Dip,	Scott and Dunn, Westburns, Dunbar, Scotland.	1 part,	35 parts
Sivelle's Sheep Dip,	John Lewis, M.P.S.I., Skib- bereen	1 gallon,	100
Snowdol Sheep Dip.	Snowdon Sons and Co., Limited, Millwall London. E.	1 gallon.	40
Special Fly Dip	The North of Ireland Chemical Co., Ltd., Belfast	14 lbs.	90
Special "Highland" Fly Dip.	Messrs. Alex. Robertson and Sons, Argyll Chemical Works, Oban, N.B.	1 lb.	5
"Sular" Sheep Dip.	The Chemical Union Ltd.,	2 lbs.	16
"Tarbol" Sheep Dip.	Ipwich	1 gallon.	50
Taylor's Powder Dip,	R. Taylor, Druggist, Timahely.	1 lb. 14 ozs (1 packet)	20
Torrens' Instantaneous Sheep Dipping Fluid.	J. M. Torrens, M.P.S.I., North Main-street, Youghal.	1 gallon,	80
"Tynedale" Sheep Dip,	John Ridley, Hexham Chemical Works, Hexham-on-Tyne.	10 lbs.	60
The "Universal" Sheep Dip- ping Powder.	The North of Ireland Chemical Co., Ltd., Belfast.	2 lbs.	20
Visanus Sheep Dip,	The Visanus Company, 14 Waterloo-lane, Glasgow.	1 gallon,	50
Watson's Fluid Sheep Dip (Non-Poisonous).	C Watson, 294 Washwood Heath-road, Birmingham	1 part,	60 parts
"Wells" Dipping Compound Sheep Dip	W. F. Wells and Son, 52 Upper Sackville-street, Dublin.	1 gallon,	80
Whelan's Powder Dip,	John M. Whelan, The Medical Hall, Galway	1 lb 14 ozs (1 packet).	20
White's Non-Poisonous Sheep Dip	P. N. White, Chemist, Silgo,	10 lbs.	50

* The proportion of dilution shown in the case of this dip is that which the Department have now approved as regards that particular preparation in substitution for a different proportion approved some time ago.

NOTES AND MEMORANDA.

The statistics relating to the Irish Spring and Summer Herring Fishing, 1910, given in the Statistical Tables show that the total amount of herrings landed this year on the Irish Coast amounted to some 10,500 tons. The money paid for the fish is estimated to have been over £56,000. which, of course, does not include the cost of handling the fish after landing. About 34,000 barrels and over 2,000 boxes were cured.

**The Irish
Spring and
Summer Her-
ring Fishing,
1910.**

Particulars of the Spring Mackerel Season of 1910 are given in the Statistical Tables.

**The Irish Spring
Mackerel
Fisheries, 1910.**

It will be seen that eighty-five thousand tons of fish were landed, showing an increase of some thousand tons over the product of the similar season of last year. About £12,100 more than was realized by the catch of the season of 1909 was paid for the fish this year. The above figures indicate an enhancement of prices this year.

The curing of Spring fish for the American Market is increasing. Formerly it was an entirely fresh fish trade. About half the catch was cured last Spring.

The fishing is proceeding at some of the stations.

At Ballina Petty Sessions, on the 2nd instant, the Skipper of the ss. "Wrenthorpe," of Fleetwood, No. F. D. 80, was prosecuted by the Department of Agriculture and Technical Instruction for Ireland for illegal trawling off the North Coast of the County Mayo. A fine of £50, with £39 15s. costs, was imposed.

**Illegal
Trawling.**

At Bantry Petty Sessions on the 17th instant the Skipper of the ss. "Labore et Honore," of Cardiff, C.F. 5, was prosecuted by the Department of Agriculture and Technical Instruction for Ireland for illegal trawling in Bantry Bay. A fine of £50, with £12 8s. costs, was imposed.

The fourth of this season's Surprise Butter Competitions was held on the 5th August, 1910. The judges were two in number, being representative butter merchants of Dublin and London. Prizes were awarded to the under-mentioned competitors:—Derrygonnelly Co-operative Agricultural and Dairy Society, Ltd.; Money-

more Co-operative Agricultural and Dairy Society, Ltd.; Irvines-town Co-operative Agricultural and Dairy Society, Ltd.; Kantoher Co-operative Dairy Society, Ltd.; Lisbellaw Co-operative Agricultural and Dairy Society, Ltd.; Doone Co-operative Agricultural and Dairy Society, Ltd.; Dromahair Co-operative Agricultural and Dairy Society, Ltd.; Drumholm Co-operative Agricultural and Dairy Society, Ltd.; Silvermines Co-operative Dairy Society, Ltd.

The fifth Competition was held on the 29th September, 1910. The judges were two in number, being representative butter merchants of Belfast and Manchester. Prizes were awarded to the undermentioned competitors:—Moneymore Co-operative Agricultural and Dairy Society, Scottish Co-operative Wholesale Society, Muckalee Co-operative Agricultural and Dairy Society, Ballyvistica Co-operative Dairy Society, Ballycanew Co-operative Agricultural and Dairy Society, Derrygonnelly Co-operative Agricultural and Dairy Society, Irvinestown Co-operative Agricultural and Dairy Society. A special additional prize of 10s. was awarded at each competition to the dairy-maid in the case of the exhibit obtaining a first-class prize.

In the examination for Science and Technological Scholarships and Teacherships-in-Training at the Royal College of Science, Dublin, fifty-five candidates competed for the five Scholarships and five Teacherships-in-Training offered for competition. The Scholarships have been won by: James Nagle, of the Christian Brothers' Schools, Youghal; Joseph

Bradley, of Mountjoy School, Dublin; William Campbell Perry, of the Academy, Ballymena; Francis D. Murnaghan, of the Christian Brothers' Schools, Omagh; and Thomas A. Casey, of Waterpark College, Waterford. The Teacherships-in-Training have been won by:—Denis R. Harte, of the Christian Brothers' School, Cork; James J. Waldron, of Blackrock College, Dublin; Louis Rey Turner, of the Educational Institute, Dundalk; James J. Smith, of the City of Dublin Technical Schools, Lower Kevin street, Dublin; and Peter J. Brannigan, of Queen's University, Belfast.

A Scholarship is of the value of £50 per annum, and, in addition, entitles the holder to free instruction during the Associate course, and third-class railway fare for one journey each session to and from Dublin.

A Teachership-in-Training entitles the holder to free instruction during the Associate Course, a maintenance allowance of 21s. per week for the session of about forty weeks each year, and third-class railway fare for one journey each session to and from Dublin.

For the Commercial Scholarships offered by the Department there were one hundred and sixteen applicants. Scholarships were awarded to:—Joseph A. Brownrigg, 163 Shirley Road, Southampton; Patrick W. Bryan, Holyrood, Esplanade, Bray; George J. T. Clam-
Commercial and Industrial Scholarships, 1910. pett, 4 Kensington Villas, Upper Mount Pleasant Avenue, Ranelagh, Co. Dublin; Maurice J. Glen-

non, 19 Upper St. Columba's Road, Drumecondra; Francis McBryan, 33 George's Street, Omagh, Co. Tyrone; Timothy J. McCormack, 9 and 10 Main Street, Tipperary; Joseph McCullough, 4 Sinclair Street, Newry, Co. Down; John McGuigan, 2 McCrory's Terrace, Armagh; Bernard F. Shields, 48 St. Joseph's Terrace, S.C.R., Dublin; Thomas W. Smyth, Woodstock Street, Athy. The object of these Scholarships, which are of the value of £100 each, and are tenable for two years, is to afford facilities for the holders' obtaining training in some higher Institution, approved by the Department, with a view to their subsequent employment as teachers of Commercial Subjects in Ireland.

For the Industrial Scholarships offered there were twenty-four applicants. Only one award was made, viz., to Charles Henry Leland, 1 Mary Street, Drogheda.

The object of these Scholarships is to enable selected persons, who must already have been engaged on one of the higher branches of the industry, to take a full course of instruction in an institution providing special courses of an approved character, with a view to training them for the management of such an industry. Candidates are required to show that there is a reasonable expectation of their being able to find suitable employment in the industry in Ireland after the termination of their Scholarships.

The Scholarships are tenable at some higher institution, to be approved by the Department, in which the industry, and the principles underlying it, are taught. They are of the value of £80 each, and may be renewed for a second or a third year at the discretion of the Department.

As a result of the recent examination, at which 72 candidates presented themselves, the following have been awarded
Scholarships, in Agriculture and Forestry. Scholarships in Agriculture:—Best, Frederick W. G., The Cairn, Aghalee, Antrim; Blake, Thomas, Albert Agricultural College, Glasnevin; Dales, Hugh, Drumra House, Boardmills, Lisburn; Fannon, Robert J., Albert Agricultural College, Glasnevin; Healy,

Thomas, Ballinaboy, Ballinhassig, Co. Cork; Hennessy, Matthew, Albert Agricultural College, Glasnevin; Kennedy, Edward J., Bantiss, Cloughjordan, Co. Tipperary; Lynch, Richard, West Street, Tallow, Co. Waterford; O'Callaghan, Denis, Albert Agricultural College, Glasnevin; Slattery, Patrick J., Albert Agricultural College, Glasnevin.

Each Scholarship entitles the holder to (1) free admission to the first year's course of instruction at the College; (2) third class railway fare for one journey to and from the College in each session; and (3) either of the following at the option of the Department:— (a) a maintenance allowance of one guinea per week while in attendance at the College, or (b) free board and residence at the Albert Agricultural College, Glasnevin, Dublin, together with a small grant towards the cost of books and apparatus.

A Scholarship is tenable for one year, but, if satisfactory progress is made by the holder, it will be renewed for a second, and even for a third year.

These Scholarships are intended principally to afford the sons of Irish farmers an opportunity for training for posts as County Instructors or Teachers under the Department's Programme, and special importance is attached to proficiency in practical work, which is the chief subject of the examination.

The Agricultural Faculty at the Royal College of Science was established by the Department in 1900. Since then there has been an increasing demand for these scholarships. Already 64 young Irishmen, who have held scholarships and passed successfully through their course at the College, have received appointments as County Instructors, Teachers, etc.

A Scholarship in Forestry has been awarded to Michael O'Beirne, Forestry Station, Avondale, Co. Wicklow, the conditions being the same as in the case of Agricultural Scholarships.

Particulars as to the subjects of examination for these Scholarships in 1911 may be obtained from the Registrar, Royal College of Science, Dublin.

According to the General Abstracts showing the Acreage under Crops and the number and descriptions of Live Stock (Cd. 5,378—1910),* the total area of corn and green crops, including flax and fruit, amounted in 1910 to 2,371,214 acres as compared

with 2,304,159 acres in 1909, an increase of 67,055 acres, or 2.9 per cent. There are increases in all our provinces amounting in

**Irish Crops
and Herds,
1910.**

* The figures presented in this return are unrevised.

Leinster to 24,266 acres or 4.0 per cent., in Munster, 6,668 acres or 1.3 per cent., in Ulster, 17,140 acres or 1.9 per cent., and in Connaught, 18,981 acres or 6.9 per cent.

Corn Crops.

The following summary shows the acreage under the several corn crops in 1909 and 1910:—

	1909.	1910.	Increase.	Decrease.
	Acres.	Acres.	Acres.	Acres.
WHEAT,	43,806	47,631	4,025	—
OATS,	1,035,735	1,073,690	37,955	—
BARLEY AND BEKE,	163,100	168,008	4,908	—
RYE,	7,464	8,681	1,217	—
BEANS,	1,026	1,839	213	—
PEASE,	264	230	—	34
Total,	1,251,795	1,300,079	48,318	34
Net Increase,			48,284	

The outstanding change in the area of corn crops as compared with that of 1909 is the general increase in the areas of wheat, oats and barley, with the exception of Ulster, which shows a decrease in barley.

The following summary shows the area of green crops in 1909 and 1910, and the increase or decrease of the several crops:—

	1909.	1910.	Increase.	Decrease.
	Acres.	Acres.	Acres.	Acres.
POTATOES,	579,799	593,065	13,266	—
TURNIPS,	276,944	275,296	—	1,648
MANGELS AND BEET ROOT,	73,437	75,287	1,850	—
CARROTS,	1,582	1,487	—	45
PARSNIPS,	683	703	20	—
CABBAGE,	39,430	30,557	—	8,573
VEGETABLES,	1,849	2,303	454	—
RAPE,	2,953	2,556	—	97
OTHER GREEN CROPS,	25,044	30,333	5,289	—
TOTAL,	1,001,671	1,012,167	20,859	10,363
Net Increase,	—	—	10,496	—

The total area of hay in 1910 is returned as 2,421,587 acres as compared with 2,278,538 in 1909—an increase of 143,049 acres, or 6.3 per cent.

Hay.

—					First Year's Hay	Second and Third Years' Hay	Hay from Permanent Meadow.
					Acres.	Acres.	Acres.
1909	.	.	.	.	498,035	332,963	1,447,540
1910	.	.	.	.	517,182	363,650	1,540,746
Increase	.	.	.	.	+ 19,147	+ 30,686	+ 93,206
Percentage	.	.	.	.	3.8	9.2	6.4

The area under hay has increased in each of the four provinces.

The area of pasture, including mountain grazing, is returned as 12,456,258 acres in 1910, as compared with 12,541,014 acres in 1909—a decrease of 84,756 acres. In this connection it should be remembered that there are certain areas which it is always difficult to classify, and which one year may be returned as “grazed” land, and another year may be returned as turf bog, or barren mountain, but the grazing value of these areas is small. The increase or decrease in pasture is best measured by the extent to which the area of crops and of hay has decreased or increased, for in such a statistical inquiry as the present the extent of the area under crops can be more exactly determined than the area of grazing land.

Live Stock.

The following are the changes in the numbers of live stock in 1910 as compared with 1909:—

—	1909.	1910.	Increase.	Decrease.
HORSES,	599,185	613,244	14,059	—
MULES AND JENNETS,	30,479	31,460	981	—
ASSES,	243,666	240,677	—	2,989
CATTLE,	4,699,564	4,688,888	—	10,676
SHEEP,	4,133,358	3,979,516	—	153,842
PIGS,	1,149,179	1,200,005	50,826	—
GOATS,	252,041	242,614	—	9,427
POULTRY,	24,104,934	24,339,015	234,081	—

STATISTICAL

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

	North Coast.				East Coast.			
	1910.		1909.		1910.		1909.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	—	—	—	—	2	8	6	16
Soles,	7	28	4	16	49	205	59	281
Turbot,	—	—	—	—	16	73	24	101
Total Prime Fish,	7	28	4	16	67	286	89	398
Cod,	22	10	2	1	758	455	1,075	635
Conger Eel,	—	—	—	—	621	270	737	302
Haddock,	41	21	8	4	731	492	764	532
Hake,	—	—	—	—	658	501	990	667
Herrings,	—	—	—	—	44,267	13,176	34,908	8,781
Ling,	—	—	—	—	344	131	931	246
Mackerel,	122	25	21	9	1,542	278	637	187
Plaice,	234	214	92	69	291	280	451	433
Ray or Skate,	2	1	—	—	674	156	775	190
Sprats,	—	—	—	—	—	—	—	—
Whiting,	—	—	2	1	492	326	1,061	608
All other except Shell Fish	143	41	56	15	939	468	2,003	874
Total,	571	340	185	115	51,384	16,819	44,421	13,873
SHELL FISH :—	No.		No.		No.		No.	
Crabs,	6,954	18	22,106	55	11,768	36	29,126	95
Lobsters,	9,630	268	24,324	617	14,613	519	12,555	401
	Cwts.		Cwts.		Cwts.		Cwts.	
Mussels,	—	—	—	—	20	1	40	1
	No.		No.		No.		No.	
Oysters,	—	—	—	—	—	—	—	—
	Cwts.		Cwts.		Cwts.		Cwts.	
Other Shell Fish,	—	—	54	6	270	139	225	70
Total,	—	286	—	678	—	695	—	567
Total value of Fish landed	—	626	—	793	—	17,514	—	14,440

NOTE.—The above figures are

TABLES.**IRELAND.**

as landed on the IRISH COASTS during the month of July, 1910, as corresponding period in 1909.

South Coast.				West Coast.				Total.			
1910.		1909.		1910		1909		1910		1909	
Quan- tity.	Value	Quan- tity.	Value	Quan- tity	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
1	2	7	15	9	14	37	55	12	24	50	86
31	138	50	224	61	235	94	407	148	626	207	928
5	20	8	31	16	73	29	117	37	166	61	249
37	160	65	270	86	342	160	579	197	816	318	1,263
79	50	212	121	5	2	59	21	864	517	1,348	778
82	30	40	15	—	—	4	2	703	300	781	319
19	13	19	12	240	86	390	214	1,031	612	1,181	782
—	—	23	20	11	7	52	19	669	508	1,065	706
2,555	569	108	35	227	73	—	—	47,049	13,818	35,016	8,816
94	50	110	78	2	1	24	8	440	182	1,065	332
16,293	3,823	14,731	2,916	14,995	3,073	7,070	1,733	32,952	8,099	22,459	4,845
159	196	214	231	108	98	248	224	792	788	1,005	957
5	2	25	8	6	2	19	4	687	161	819	202
—	—	120	23	—	—	—	—	—	—	120	23
80	18	77	30	536	159	217	66	1,108	503	1,357	705
353	175	578	233	344	193	638	265	1,779	877	3,275	1,387
19,756	5,086	16,322	3,992	16,500	4,936	8,881	3,135	88,271	27,181	69,809	21,115
No. 4,018	29	No. 6,615	52	No. 107	1	No. 3,531	88	No. 22,847	84	No. 61,378	290
36,846	1,225	11,124	347	30,867	894	92,774	1,768	91,956	2,906	110,777	3,133
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	20	Cwts.	40
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
260	26	120	12	455	80	212	42	98	245	611	130
—	1,280	—	411	—	975	—	1,898	—	3,236	—	3,554
—	6,366	—	4,403	—	5,911	—	5,033	—	30,417	—	24,669

subject to correction in the Annual Returns.

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

—	North Coast.				East Coast.			
	1910.		1909.		1910.		1909.	
	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	—	—	—	—	7	15	4	9
Soles,	6	24	4	17	89	364	80	307
Turbot,	—	—	—	—	42	184	22	97
Total Prime Fish, . .	6	24	4	17	138	563	106	413
Cod,	52	27	—	—	765	503	729	492
Conger Eel,	—	—	—	—	632	241	621	217
Haddock,	26	12	7	3	697	477	589	435
Hake,	—	—	—	—	709	532	611	482
Herrings,	434	133	44	16	38,831	12,707	43,659	11,008
Ling,	—	—	—	—	420	166	651	166
Mackarel,	60	15	53	31	2,704	397	1,180	357
Plaice,	296	265	118	75	583	593	425	431
Ray or Skate,	35	6	—	—	771	185	712	177
Sprats,	—	—	—	—	—	—	—	—
Whiting,	24	14	—	—	461	328	765	465
All other except Shell Fish	89	22	352	68	877	460	1,236	518
Total,	1,022	518	578	210	47,588	17,152	51,284	15,161
SHELL FISH :—	No.		No.		No.		No.	
Crabs,	13,100	28	28,053	59	19,541	54	25,214	83
Lobsters,	18,865	454	36,122	952	13,402	430	14,129	542
	Cwts.		Cwts.		Cwts.		Cwts.	
Mussels,	—	—	—	—	40	1	50	1
	No.		No.		No.		No.	
Oysters,	—	—	—	—	—	—	—	—
	Cwts.		Cwts.		Cwts.		Cwts.	
Other Shell Fish, . .	—	—	16	2	248	142	124	43
Total,	—	482	—	1,013	—	627	—	669
Total value of Fish landed	—	1,000	—	1,223	—	17,779	—	15,830

NOTE.—The above figures are

IRELAND.

as Landed on the Irish Coasts during the month of August, 1910, as corresponding period in 1909.

South Coast.				West Coast.				Total.			
1910.		1909.		1910.		1909.		1910.		1909.	
Quantity.	Value	Quantity.	Value	Quantity.	Value	Quantity.	Value	Quantity.	Value	Quantity.	Value
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
5	12	16	37	1	3	31	44	13	30	51	90
43	201	55	248	71	223	119	503	209	812	258	1,075
6	24	16	66	15	77	44	167	63	285	82	330
54	237	87	351	87	303	194	714	285	1,127	391	1,495
6	3	61	36	—	—	43	26	823	533	833	554
41	17	72	13	—	—	8	6	673	258	701	236
12	11	11	7	105	67	160	90	840	567	767	535
22	21	31	30	71	33	—	—	802	586	642	512
1,591	324	1,255	269	64	27	296	134	40,920	13,191	45,254	11,427
16	8	30	21	—	—	—	—	436	174	681	187
10,303	2,617	13,605	2,600	4,080	1,226	2,506	707	17,147	4,255	17,344	3,695
206	240	238	282	147	134	252	214	1,232	1,232	1,033	1,002
12	6	9	2	7	3	14	2	825	200	735	181
61	17	285	47	—	—	—	—	61	17	285	47
202	83	167	66	212	77	85	51	899	502	1,017	582
429	160	974	340	468	240	957	376	1,863	882	3,519	1,302
12,955	3,744	16,825	4,064	5,241	2,110	4,515	2,320	66,806	23,524	73,202	21,755
No.		No.		No.		No.		No.		No.	
2,438	18	1,975	12	5,822	18	471	2	40,901	118	55,713	156
32,996	1,021	12,064	371	17,363	549	68,341	2,012	82,626	2,454	130,656	3,877
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
—	—	—	—	—	—	—	—	40	1	50	1
No.		No.		No.		No.		No.		No.	
—	—	—	—	—	—	—	—	—	—	—	—
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
250	25	250	25	453	79	406	72	956	246	796	142
—	1,064	—	408	—	646	—	2,086	—	2,819	—	4,176
—	4,808	—	4,472	—	2,756	—	4,406	—	26,343	—	25,931

subject to correction in the Annual Returns.

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned
compared with the

	North Coast.				East Coast.			
	1910.		1909.		1910.		1909.	
	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	—	—	—	—	7	14	6	14
Soles,	17	88	7	28	126	511	89	358
Turbot,	2	5	—	—	47	198	24	101
Total Prime Fish,	19	93	7	28	180	723	119	473
Cod,	98	50	16	8	864	587	745	532
Conger Eel,	—	—	14	7	646	312	660	217
Haddock,	—	—	24	12	710	498	611	445
Hake,	—	—	—	—	620	492	595	477
Herrings,	1,506	691	8,195	3,213	37,459	9,380	30,519	8,015
Ling,	—	—	—	—	460	174	647	166
Mackerel,	249	23	96	12	1,854	315	2,315	431
Plaice,	406	403	86	67	619	650	602	620
Ray or Skate,	272	67	83	21	705	189	714	175
Sprats,	—	—	—	—	—	—	—	—
Whiting,	12	11	—	—	387	263	708	465
All other except Shell Fish,	192	43	241	53	1,047	487	911	490
Total,	2,754	1,381	8,762	3,421	45,551	14,070	39,146	12,506
SHELL FISH :—	No.		No.		No.		No.	
Crabs,	9,684	21	9,888	22	8,874	27	10,180	35
Lobsters,	7,298	180	10,781	308	14,386	443	4,199	160
	Cwts.		Cwts.		Cwts.		Cwts.	
Mussels,	—	—	—	—	470	44	193	16
	No.		No.		No.		No.	
Oysters,	—	—	—	—	1,950	5	—	—
	Cwts.		Cwts.		Cwts.		Cwts.	
Other Shell Fish,	—	—	—	—	237	143	73	37
Total,	—	201	—	330	—	662	—	248
Total value of Fish Landed,	—	1,582	—	3,751	—	14,732	—	12,754

NOTE.—The above figures are

IRELAND.

as landed on the IRISH COASTS during the month of September, 1910, as corresponding period in 1909.

South Coast.				West Coast.				Total.			
1910.		1909.		1910.		1909.		1910.		1909.	
Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
3	6	14	33	5	7	5	9	15	27	25	56
55	242	61	289	98	316	134	574	298	1,187	291	1,249
3	12	12	48	18	85	40	165	70	390	76	314
61	260	87	370	121	438	179	748	381	1,514	392	1,619
10	4	30	9	2	1	37	14	974	642	828	563
10	6	73	14	16	7	8	3	672	325	755	241
10	9	27	12	154	94	393	213	874	601	1,055	682
19	21	19	17	94	43	86	40	733	556	700	534
3 126	817	1,014	284	1,702	615	1,493	578	41,093	11,533	11,221	12,090
2	1	23	5	-	-	-	-	462	175	670	171
38,681	7,416	15,933	3,637	29,978	8,051	25,407	4,795	70,762	15,835	43,751	8,275
211	280	215	282	127	108	412	326	1,393	1,441	1,315	1,295
11	5	20	5	11	2	23	4	999	263	840	295
179	61	8	2	-	-	-	-	479	61	8	2
337	146	260	77	133	48	325	127	869	468	1,293	669
830	319	1,025	373	513	268	873	362	2,582	1,117	3,050	1,278
11,117	9,375	18,734	4,487	32,851	9,705	29,236	7,210	125,273	34,531	95,878	27,624
No.		No.		No.		No.		No.		No.	
832	7	914	6	1,720	7	673	3	21,110	62	21,655	66
32,505	1,089	10,476	385	13,958	441	30,802	965	6,814	2,153	56,258	1,818
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
36	5	12	2	-	-	-	-	506	49	210	18
No.		No.		No.		No.		No.		No.	
-	-	2,646	11	-	-	-	-	1,950	5	2,646	11
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
282	29	396	40	358	62	462	80	877	234	931	157
-	1,130	-	444	-	510	-	1,048	-	2,503	-	2,070
-	10,505	-	4,931	-	10,215	-	8,258	-	37,034	-	29,694

subject to correction in the Annual Returns.

IRISH SPRING AND SUMMER

No.	Collecting Station.	Ports or Creeks from which the Fishing was carried on.	Places at which the Boats discharged their Fish.	Date when Fishing may be said to have commenced.
1	Howth, . . .	Howth, . . .	Howth, . . .	24th May .
2	Ringsend, . .	Ringsend, . .	Ringsend, . .	—
3	Dunmore East, .	Dunmore East, .	Dunmore East, .	22nd April. .
4	Helvick Head, .	Ballinagoul, . .	Dungarvan, . .	10th May. .
5	Ballycotton, . .	Ballycotton, . .	Ballycotton, . .	11th May. .
6	Upper Cove, . .	Kinsale, . . .	Kinsale, . . .	14th May. .
7	Union Hall, . .	—	—	—
8	Baltimore, . . .	Baltimore, . . .	Baltimore, . . .	23rd June, .
9	Bantry,	Bantry,	Bantry,	1st February, .
10	Ballycrovane, .	Colaris, Ard- groom, Clen- dria and Derry- vegil.	Ardgroom, . . .	15th March, .
11	Killybegs, . . .	Killybegs, . . .	Killybegs, . . .	8th March, .
12	Burtonport, . .	Burtonport and Edernish.	Burtonport and Edernish.	February, . .
13	Kincasslagh, . .	Kincasslagh, . .	Gortnasate, . .	1st February, .
14	Mulroy,	Downings Bay, .	Downings Pier, .	2nd February, .
15	Rathmullan, . .	Rathmullan, . .	Rathmullan, . .	1st February, .
16	Buncrana, . . .	Buncrana, . . .	Buncrana, . . .	1st February, .
17	Londonderry, . .	Londonderry, . .	Londonderry, . .	February, . .
18	Cloghy,	Portavogie, . .	Portavogie, . .	28th April. .
19	Ardglass, . . .	Ardglass, . . .	Ardglass, . . .	3rd May, . .
20	Kilkeel,	Kilkeel,	Kilkeel,	3rd February, .
21	Clogher Head, .	Clogher Head, .	Clogher Head, .	31st May, . .

HERRING FISHERY, 1910 (TABLE NO. I.)

Date when Fishing may be said to have ended.	Quantity landed.	Value.	Quantity cured for Exportation.	Quantity sold for Local Consumption.	No.
	Cwts.	£. s. d.			
*31st July, .	25,174½	7,640 12 9	1,400 barrels, & 350 mease kippered	—	1
—	331	127 11 0	—	—	2
6th July, .	2,492½	527 5 6	—	One-eighth.	3
6th July, .	902	282 7 0	—	All.	4
23rd June.	258	96 6 0	—	—	5
22nd June,	3,082	602 18 0	—	One-eleventh.	6
—	1,345	254 7 6	100 barrels.	Balance.	7
30th July,	1,409	365 3 9	252 barrels.	—	8
28th February	1,467	230 5 6	—	—	9
15th April, .	315	60 0 0	85 barrels,	—	10
25th May, .	1,869	338 14 0	63 barrels, .	—	11
May, . . .	1,800	455 0 0	478 barrels, & 2,070 boxes kippered.	—	12
28th May, .	5,351	1,473 9 0	1,758½ barrels.	—	13
12th June, .	30,302½	8,859 14 8	10,233 barrels	—	14
27th May, .	16,940	4,840 0 0	5,938 barrels.	—	15
3rd June, .	73,752	18,340 13 0	9,823 barrels,	—	16
March, . .	6,518	1,109 16 6	1,305 barrels,	—	17
*31st July, .	3,898	1,262 7 6	—	One-eighth.	18
†31st July, .	21,624	6,495 7 9	2,285 barrels.	Balance.	19
*31st July, .	7,961	2,222 1 6	182 barrels.	Five-eighths.	20
27th July, .	454½	181 13 8	—	All.	21
Total, . .	207,246	55,765 14 7	33,902½ barrels. 2070 boxes. 350 mease.		

IRISH SPRING AND SUMMER HERRING FISHERY, 1910.

TABLE NO. I.—*continued.*

No.	Coast Guard Station.	Quantity despatched to other markets for sale as fresh Fish.	Places where the Herrings were cured.	Month in which greatest Quantity captured.	Number of Steam Drifters that fished from Ports within this Station.	Number of Irish Row Boats using Seine or Bng Nets.	OBSERVATIONS.
1	Howth,	Balance,	Howth,	July,	18*	—	—
2	Ringsend,	—	—	—	—	—	Landed by steam trawlers.
3	Dunmore East,	Balance,	—	June,	2 $\frac{1}{4}$	—	—
4	Helvick Head,	—	—	June,	—	—	—
5	Ballycotton,	All,	—	May,	—	—	—
6	Upper Cove,	Balance,	—	May,	2	—	—
7	Union Hall,	—	Glandore and Union Hall.	—	—	—	Landed by Mackerel boats.
8	Baltimore,	Balance,	Baltimore,	July,	—	—	—
9	Bantry,	Nearly all,	—	February,	—	3	—
10	Ballycrovane,	Balance,	Ardgroom,	April,	—	—	—
11	Killybegs,	Balance,	Killybegs,	March,	—	—	—
12	Burtonport,	—	Burtonport and Edernish.	May,	5	—	—
13	Kincaaslagh,	—	Gortnasate,	May,	6	—	—
14	Mulroy,	—	Downings,	May,	—	—	—
15	Rathmullan,	—	Rathmullan,	February,	80	—	—
16	Buncrana,	Balance,	Buncrana,	February,	199	—	—
17	Londonderry,	Balance,	Londonderry,	February,	36	—	—
18	Cloghy,	Balance,	—	June,	—	—	—
19	Ardglass,	Four-ninths,	Ardglass,	July,	1	—	—
20	Kilkeel,	Balance,	—	July,	—	—	—
21	Clogher Head,	—	—	July,	—	—	—

* 10 motor drifters also fished from Howth.

+ 2 „ „ „ „ „ „ Dunmore East.

IRISH SPRING AND SUMMER HERRING FISHERY, 1910.

TABLE NO. II.

Herrings were also landed at the places set forth below, which are not included in the foregoing Return.

Collecting Stations.	Places where landed.	Quantity	Value.
		Cwts.	£ s. d.
Kingstown, . . .	Kingstown,	82½	35 5 0
Arklow,	Arklow,	45	40 2 6
Ballinacourty, . . .	Dungarvan,	28	5 4 0
Youghal,	Youghal,	162	52 7 6
Queenstown,	Queenstown,	233	66 14 0
Courtnacsherry, . . .	Courtnacsherry,	7	1 16 9
Galley Head,	Galley Head,	¾	0 10 0
Castletownshend, . .	Castletownshend, . . .	158	57 10 0
Crookhaven,	Crookhaven, Spanish Cove and Goleen.	12½	7 16 6
Castletownbere, . . .	Castletownbere,	119	23 14 0
Lackeen,	Rossmore Island,	20	4 0 0
Knightstown,	Valentia Harbour,	31	5 16 0
Cahiriveen,	Cahiriveen,	28	5 10 0
Ventry,	Ventry,	5	1 5 0
Ballinagall,	Ballydavid, Doneen, Smerwick and Ballinaraght.	180	72 0 0
Kilkee,	Kilkee,	34	20 14 6
Liscannor,	Liscannor,	6	3 7 6
South Arran,	South Arran,	174½	54 7 6
North Arran,	Kilronan,	109½	28 7 1
Galway,	Galway,	5½	3 4 0
Roundstone,	Roundstone,	23	9 7 3
Cleggan, *	Cleggan,	231½	78 7 0
Inishboffin, †	Boffin Island,	80	20 0 0
Keel,	Dooega,	40	37 10 0
Belmullet,	Belmullet,	7	4 2 0
Mullaghmore,	Mullaghmore,	15	5 11 0
Teelin,	Teelin and Cladnageeragh, . .	185½	41 2 3
Ballycastle,	Ballycastle,	9½	4 5 0
Portmuck,	Portmuck, Hiddlesport, Hills- port and Brownsbay	24	13 0 0
Carrickfergus,	Carrickfergus,	32	14 5 0
Whitehead,	Hillsport, Whitehead, and Cloughfinn.	14	6 6 0
Newcastle,	Newcastle,	4	0 14 6
Annalong,	Annalong,	17½	5 4 6
Greenore,	Carlingford,	22½	6 5 0
Balbriggan,	Balbriggan,	133	41 13 0
Skerries,	Skerries,	193	101 7 0
Rush,	Rush,	52	24 7 6
	Total,	2,524½	902 18 10

* 63 barrels of herrings were cured at Cleggan.

† 27 „ „ „ „ Inishboffin.

IRISH SPRING MACKEREL

No.	Places where Fish are landed.	Collecting Stations.	Date when Fishing may be said to have commenced.	Date when Fishing may be said to have ended.	Quantity captured.
					cwts
1	Howth,	Howth,	—	—	680
2	Dunmore East,	Dunmore East,	—	—	772
3	Dungarvan,	Helvieck Head,	10th June,	22nd July,	279
4	Ballycotton,	Ballycotton,	11th May,	19th July,	703½
5	Kinsale,	Upper Cove,	1st April,	21st June,	19,505
6	Union Hall and Glandore,	Union Hall,	6th April,	27th July,	9,608
7	Castletownsend,	Castletownsend,	1st April,	31st July,	3,181
8	Baltimore,	Baltimore,	18th April,	16th July,	28,417
9	Schull and Cape Clear,	Schull,	25th April,	20th July,	3,673
10	Castletown Berehaven,	Castletown Berehaven,	18th April,	19th July,	12,854
11	Garnish and Dursey,	Garnish and Dursey,	1st March,	15th July,	2,177
12	Ballycrovane, Urban, Cod Head, Derryvegil, Clendria, Gortahig, Kil- catherine, Ardgroom, Gurteen and Travarra.	Ballycrovane,	Beginning of April.	Middle of June.	1,578
13	Portmagee,	Portmagee,	12th May,	15th July,	3,640
14	Valentia Harbour,	Knightstown,	11th April,	23rd July,	29,174
15	Dingle and Ballymore,	Dingle,	1st March,	31st July,	10,150
16	Minard West & Anniscaul,	Dingle,	May,	July,	380
17	Dooneen and Ballydavid,	Ballinagall,	April,	July,	2,450
18	Brandon Creek,	Brandon Creek,	27th March,	14th May,	800
19	Brandon Quay,	Brandon Bay,	27th April,	15th June,	1,167½
20	Fenit,	Fenit,	13th April,	11th June,	1,397
21	Kilronan,	North Arran,	14th April,	19th July,	4,821
22	Roundstone,	Roundstone,	23rd April,	31st July,	5,400
23	Dunloughan and Bun- owen.	Dunloughan,	30th April,	20th July,	7,000
24	Cleggan,	Cleggan,	13th April,	19th July,	11,315
25	Boffin and neighbouring islands.	Inishboffin,	Middle of April.	12th July,	2,800
26	Porturlin,	Porturlin,	1st April,	31st May,	540
27	Portacloy,	Portacloy,	1st April,	31st May,	360
28	Belderrig,	Belderrig,	1st March,	1st June,	413
29	Rathlacken,	Rathlacken,	23rd June,	29th July,	732
30	Mullaghmore,	Mullaghmore,	7th June,	30th July,	565
31	Killybegs,	Killybegs,	11th May,	30th July,	426
32	Buncrana,	Mulroy,	—	—	400
33	Ardglass,	Ardglass,	—	—	613
34	Kilkeel,	Kilkeel,	—	—	360
Total,					168,321½

* The fish cured at Dingle includes mackerel landed at

FISHING, 1910

Total approximate Value.	Number of Steamers carrying the Fish to England.	Number of Ice Hulks.	Number of Tons of Ice imported.	Number of Barrels of Fish cured for ex- portation.	Observations.	No.
£ s. d.						
159 18 6	—	—	—	—	Taken in herring nets.	1
179 5 0	—	—	—	—	Taken in herring nets.	2
96 12 6	—	—	—	—	—	3
182 11 0	—	—	—	—	—	4
4,938 2 6	1	2	450	1,549	—	5
		ice houses				
2,237 13 0	1	—	—	2,020	—	6
799 13 0	—	—	—	810	—	7
6,475 13 6	1	1	380	2,448	—	8
939 12 6	—	—	—	1,187	—	9
2,721 18 6	—	—	—	3,152	—	10
600 11 0	3	—	—	710	—	11
343 14 0	—	—	—	279	—	12
1,201 14 6	2	—	—	1,198	—	13
7,753 18 6	—	2	360	4,530	—	14
2,669 0 0	—	—	—	4,158*	—	15
95 0 0	—	—	—	—	—	16
392 0 0	—	—	—	355	—	17
213 0 0	—	—	—	—	—	18
273 0 0	—	—	—	400	—	19
438 19 7	—	Store on Pier	200	—	—	20
777 3 6	2	1	260	667	—	21
1,665 6 0	—	1	200	1,196	169 barrels of cured fish were shipped to Norway	22
1,502 15 0	—	—	—	1,017	—	23
2,635 17 9	9 vessels carried away cured fish	1	250	1,853	300 barrels of cured fish were shipped to Norway.	24
750 0 0	—	—	—	934	—	25
162 0 0	—	—	—	—	—	26
100 0 0	—	—	—	—	—	27
107 0 0	—	—	—	—	—	28
239 0 0	—	—	—	—	—	29
97 0 0	—	—	—	—	—	30
74 5 0	—	—	—	—	—	31
24 17 2	—	—	—	—	Taken in herring nets.	32
63 13 9	—	—	—	—	Do. do.	33
63 16 10	—	—	—	—	Do. do.	34
40,974 12 7	—	—	—	28,463		

IRISH SPRING MACKEREL FISHING, 1910

(TABLE NO. II.).

Mackerel were also landed at the places set forth below, which are not included in the foregoing Return.

Collecting Stations.	Places where landed.	Quantity	Value.	Barrels Cured.
		cwts.	£ s. d.	
Ardmore, .	Ardmore,	140	15 0 0	—
Youghal, .	Youghal,	58½	18 18 0	—
Queenstown, .	Queenstown,	225	64 17 0	—
Courtmacsherry, .	Courtmacsherry,	11½	3 18 9	—
Galley Head, .	Galley Head,	1	0 15 0	—
Crookhaven, .	Crookhaven, Goleen and Spanish Cove, .	153	40 12 0	18
Bantry, .	Bantry,	2	1 1 0	—
Ballydonegan, .	Ballydonegan, Tranferla and Esquavade .	56	12 17 0	—
Waterville, .	Ballinskelligs,	30	7 10 0	—
Caherciveen, .	Caherciveen,	8	4 4 0	—
Ventry, .	Dunquin and Blasket Islands, .	200	67 10 0	20
Kilkee, .	Kilkee,	35½	19 14 3	—
Coosheen, .	Farraly,	9½	4 15 0	—
Seafeld, .	Seafeld,	4½	1 10 0	—
Liscannor, .	Liscannor,	104	51 8 0	—
Ballaghalina, .	Ballaghalina,	108½	52 0 0	—
Galway, .	Galway,	201	66 4 0	—
Tully, .	Tully,	70	15 0 0	23
Clew Bay, .	Creeks in Clew Bay,	53	20 12 0	—
Achilbeg, .	Achilbeg and Curraun,	169	75 0 0	—
Keel, .	Keel,	93	59 11 0	—
Blacksod Point, .	Inishkea Island,	240	72 0 0	—
Belmullet, .	Belmullet	93	41 14 0	—
Tribane, .	Ballyetherland, Ballysiggart and Casson Cove.	240	42 0 0	—
Teelin, .	Teelin and Cladnageragh,	10½	4 0 0	—
Burtonport, .	Burtonport,	105	18 17 6	—
Dunfanaghy, .	Dunfanaghy,	17	5 18 9	—
Buncrana, .	Buncrana,	200	49 17 0	—
Portstewart, .	Portstewart,	10½	6 6 0	—
Londonderry, .	Londonderry,	3	0 10 0	—
Portavogie, .	Portavogie,	3	1 9 4	—
Annalong, .	Annalong,	13½	6 18 0	—
Greenore, .	Carlingford,	15½	2 4 0	—
Dundalk, .	Giles Quay,	144	36 0 0	—
Balbriggan, .	Balbriggan,	26½	4 11 0	—
Rush, .	Rush,	6	3 2 6	—
		2,860½	898 5 1	61

**STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned
as landed on the IRISH COASTS during the Month and Nine
Months ended 30th September, 1910, compared with the corre-
sponding Periods of the Year 1909.**

	September.		Nine Months ended 30th September.	
	1910.	1909.	1910.	1909.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Brill,	15	25	233	353
Soles,	206	291	1,788	2,129
Turbot,	70	76	453	565
Total Prime Fish,	381	392	2,474	3,047
Cod,	974	828	18,646	22,776
Conger Eel,	672	755	5,992	7,655
Haddock,	874	1,055	12,401	13,036
Hake,	733	700	7,244	6,699
Herrings,	44,093	41,221	375,380	352,769
Ling,	462	670	5,010	9,051
Mackerel,	70,762	43,751	250,833	213,750
Plaice,	1,393	1,315	9,614	8,718
Ray or Skate,	999	840	8,242	8,656
Sprats,	479	8	942	1,201
Whiting,	869	1,293	10,609	11,508
Fish not separately distinguished, except Shell Fish,	2,582	3,060	16,374	20,350
Total	125,273	95,878	723,741	679,246
No.				
Shell Fish —	No.	No.	No.	No.
Crabs,	21,110	21,655	135,344	213,386
Lobsters,	6,814	56,258	284,286	393,813
Oysters,	1,950	2,646	90,893	148,096
	Cwts.	Cwts.	Cwts.	Cwts.
Mussels,	506	210	5,973	2,663
Other Shell Fish,	877	981	9,355	10,502
VALUE.				
	£	£	£	£
Brill,	27	56	415	538
Soles,	1,187	1,249	7,690	7,718
Turbot,	300	314	1,936	2,097
Total Prime Fish,	1,514	1,619	10,041	10,353
Cod,	642	563	10,030	11,291
Conger Eel,	325	241	2,206	2,896
Haddock,	601	682	7,805	7,993
Hake,	536	532	5,223	4,741
Herrings,	11,533	12,090	96,878	82,881
Ling,	175	171	1,900	3,001
Mackerel,	15,835	8,275	58,708	37,402
Plaice,	1,441	1,295	10,360	7,596
Ray or Skate,	263	205	2,013	1,974
Sprats,	61	2	159	167
Whiting,	468	669	5,928	6,045
Fish not separately distinguished, except Shell Fish,	1,117	1,278	7,447	7,706
Total,	34,531	27,624	218,737	184,028
Shell Fish :—				
Crabs,	62	66	462	813
Lobsters,	2,153	1,818	11,066	10,326
Oysters,	5	11	578	208
Mussels,	49	18	162	169
Other Shell Fish,	234	157	2,405	2,842
Total,	2,503	2,070	14,763	13,858
Total Value of Fish landed,	37,034	29,694	233,500	197,886

NOTE.—The above figures are subject to correction in the Annual Returns.

STATEMENT of the TOTAL QUANTITY of FISH landed on the ENGLISH and WELSH COASTS during the Month and Nine Months ended 30th September, 1910, compared with the corresponding Periods of the Year 1909.

	September.		Nine months ended 30th September.	
	1910.	1909.	1910.	1909.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Brill,	1,079	1,404	11,251	14,338
Soles,	5,697	5,649	44,207	40,684
Turbot,	4,067	4,575	37,121	44,488
Prime Fish not separately distinguished,	297	301	3,261	3,973
Total Prime Fish,	10,540	11,929	95,840	112,483
Breain,	8,289	4,888	43,403	58,467
Catfish,	6,102	4,515	57,016	59,035
Coalfish,	38,848	20,629	254,935	170,357
Cod,	178,275	170,984	1,901,647	1,657,787
Conger Eels,	4,584	5,062	32,150	35,350
Dabs,	9,727	10,119	85,880	82,608
Dogfish,	939	1,116	14,354	18,358
Dory,	137	229	1,322	1,380
Flounders or Flukes, ..	453	421	4,274	5,811
Gurnards,	7,534	8,379	75,946	81,135
Haddock,	229,622	213,171	1,484,908	1,661,106
Hake,	68,045	54,768	684,235	772,862
Halibut,	18,547	19,469	116,766	135,467
Latchets (Tubs),	242	194	2,067	3,082
Lemon Soles,	4,966	5,013	43,963	42,291
Lung,	22,422	19,167	163,678	171,302
Megrim,	11,475	9,255	86,779	78,340
Monks (or Anglers), ..	3,242	3,022	26,679	26,245
Mullet (Red),	4	7	324	241
Plaice,	77,282	90,994	698,998	856,333
Pollack,	2,650	2,803	22,054	17,977
Skates and Rays,	33,314	33,705	273,943	309,877
Torsk,	3,267	3,026	13,384	16,456
Whiting,	29,331	29,463	256,510	207,658
Witches,	1,505	1,806	27,826	30,646
Herrings,	445,488	456,319	1,467,455	1,446,122
Mackerel,	18,402	10,507	379,494	328,035
Mullet (Grey),	50	40	792	782
Pilchards,	50,758	23,317	86,460	54,348
Sprats,	1,460	25	29,136	32,810
Whitebait,	355	369	5,167	5,368
Fish not separately distinguished,	27,832	28,430	271,941	255,951
Total,	1,315,687	1,243,141	8,709,326	8,734,068
Shell :—	No.	No.	No.	No.
Crabs,	218,870	167,996	4,298,317	4,310,331
Lobsters,	61,584	49,347	485,776	501,882
Oysters,	1,585,231	2,154,268	10,983,481	12,901,022
Other Shell Fish, ..	Cwts. 45,009	Cwts. 49,988	Cwts. 295,586	Cwts. 306,072

NOTE.—The figures for 1910 are subject to correction in the Annual Returns.

STATEMENT of the TOTAL VALUE of FISH landed on the ENGLISH and WELSH COASTS during the Month and Nine Months ended 30th September, 1910, compared with the corresponding Periods of the Year 1909.

	September.		Nine months ended 30th September.	
	1910.	1909.	1910.	1909.
	VALUE.			
	£	£	£	£
Brill.	3,474	4,219	36,481	41,586
Soles,	34,380	37,870	298,622	322,585
Turbot,	20,625	20,866	179,139	185,774
Prime Fish not separately distinguished,	426	475	4,834	5,978
Total Prime Fish, . .	58,905	63,430	519,076	555,923
Bream,	1,451	975	12,012	12,694
Catfish,	2,538	1,690	23,547	18,296
Coalfish,	6,317	3,282	47,957	28,725
Cod,	85,328	76,662	892,200	707,010
Conger Eels,	3,556	3,487	25,190	25,895
Dabs,	5,745	5,478	59,246	50,889
Dogfish,	268	306	4,213	4,729
Dory,	114	152	1,256	1,109
Flounders or Flukes, .	362	307	2,798	3,241
Gurnards,	1,736	1,807	19,582	18,384
Haddock,	104,363	100,894	864,959	891,848
Hake,	56,757	43,302	495,883	467,127
Hallbut,	41,517	41,431	283,702	296,492
Latchetts (Tubs), . .	111	91	1,149	1,845
Lemon Soles,	10,261	9,838	91,685	79,537
Ling,	8,383	6,398	66,504	60,032
Megrim,	6,225	5,836	54,311	49,242
Monks (or Anglers), .	1,311	1,284	11,417	10,675
Mullet (Red),	12	32	1,002	629
Plaice,	91,840	87,329	694,375	701,937
Pollack,	1,068	1,188	9,920	7,471
Skates and Rays, . . .	18,978	17,927	168,031	168,573
Torsk,	1,168	901	5,738	5,665
Whiting,	10,072	9,784	123,676	94,301
Witches,	1,421	1,686	34,204	31,158
Herrings,	167,392	188,002	444,911	513,111
Mackrel,	7,181	5,198	175,128	166,346
Mullet (Grey),	140	110	1,427	1,358
Pilchards,	21,775	8,627	36,550	18,886
Sprats,	97	14	4,619	4,285
Whitebait,	718	737	9,791	8,840
Fish not separately distinguished,	14,981	18,943	161,064	149,190
Total,	732,091	707,128	5,347,123	5,155,443
Shell Fish :—				
Crabs,	3,656	2,985	48,184	49,010
Lobsters,	2,946	2,411	23,219	24,096
Oysters,	3,901	7,146	30,167	40,420
Other Shell Fish, . . .	12,595	13,693	80,195	86,819
Total,	23,098	26,235	181,765	200,345
Total value of all Fish,	755,189	733,363	5,528,888	5,355,788

NOTE.—The figures for 1910 are subject to correction in the Annual Returns.

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as landed on the SCOTTISH COASTS during the Month and Nine Months ended 30th September, 1910, compared with the corresponding periods of the Year 1909.

	September.		Nine Months ended 30th September.	
	1910.	1909.	1910.	1909.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Herrings,	303,907	355,758	5,480,147	4,422,098
Sprats,	—	12,344	832	15,587
Sparlings,	20	89	142	162
Mackerel,	9,702	4,523	40,131	30,748
Cod,	53,066	41,364	817,028	679,823
Ling,	21,103	10,845	196,321	169,155
Torsk (Tusk),	1,067	675	14,947	14,909
Saith (Coal Fish),	11,206	11,501	123,529	142,870
Haddock,	94,100	84,700	661,108	744,671
Whiting,	14,580	10,730	115,464	90,812
Conger Eel,	592	390	22,503	22,489
Turbot,	548	584	3,987	4,894
Hallbut,	5,423	4,245	42,263	42,615
Lemon Soles,	5,536	4,255	34,705	31,465
Flounders, Plaice, Brill,	7,097	5,054	48,726	51,388
Skate and Ray,	9,067	6,553	115,596	99,877
Fish not separately distinguished, except Shell Fish,	13,128	10,992	92,823	78,245
Total,	550,152	567,619	7,860,149	6,842,902
Shell Fish —	No.	No.	No.	No.
Crabs,	130,242	135,862	1,019,397	2,356,752
Lobsters,	87,094	94,727	£31,002	545,034
Oysters,	36,840	88,326	548,012	834,821
	Cwts.	Cwts.	Cwts.	Cwts.
Clams,	270	399	5,830	4,761
Mussels,	9,922	7,672	60,090	99,027
Other Shell Fish,	2,968	3,047	34,329	36,540
VALUE.				
	£	£	£	£
Herrings,	79,265	136,844	1,541,935	1,536,240
Sprats,	—	1,412	191	1,855
Sparlings,	54	242	428	425
Mackerel,	2,234	1,398	9,897	9,131
Cod,	25,592	19,516	320,911	243,214
Ling,	6,251	2,800	61,017	43,624
Torsk (Tusk),	295	211	4,057	3,345
Saith (Coal Fish),	1,873	1,764	24,886	19,532
Haddock,	44,516	36,463	376,540	350,403
Whiting,	4,656	3,218	48,675	34,711
Conger Eel,	206	144	8,993	7,849
Turbot,	1,981	2,089	13,737	16,229
Hallbut,	10,939	7,403	78,707	70,157
Lemon Soles,	9,867	7,545	59,814	54,652
Flounders, Plaice, Brill,	8,248	6,690	62,091	59,645
Skate and Ray,	1,601	1,208	25,443	22,161
Fish not separately distinguished except Shell Fish,	4,370	3,971	37,945	31,690
Total,	201,918	224,888	2,675,247	2,502,863
Shell Fish —				
Crabs,	914	764	12,481	14,242
Lobsters,	3,705	4,108	26,293	25,714
Oysters,	316	317	2,189	2,989
Clams,	40	55	875	717
Mussels,	454	333	2,720	3,138
Other Shell Fish,	1,045	1,023	9,045	10,088
Total,	6,474	6,600	53,553	56,888
Total Value of Fish landed,	208,422	231,488	2,728,800	2,560,751

NOTE.—The above figures are subject to correction in the Annual Returns.

QUARTERLY AVERAGE PRICES of CROPS, LIVE STOCK, MEAT, PROVISIONS, &c.,
for the period ended 30th SEPTEMBER, 1910.

PRODUCT	PROVINCE				IRELAND	
	Leinster.	Munster	Ulster.	Con-naught.	1910	1909
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
CROPS:—						
Wheat, . . . per 112 lbs.	7 2½	7 0	—	—	7 1½	7 11½
Oats White) . . . "	6 2	5 6	6 0½	6 7½	5 10½	6 10½
(Black) . . . "	5 8½	4 11	—	—	5 0½	5 7
Barley . . . "	—	6 11½	—	—	6 11½	7 4½
Potatoes, . . . "	3 10½	3 0½	2 4½	3 6½	3 5½	3 1
Hay (Clover) . . . "	4 1	2 8½	3 4½	2 8½	3 4½	3 7
(Meadow) . . . "	2 10½	2 3	3 4½	2 4½	2 6	2 5½
Grass Seed—						
(Perennial Rye) . . . "	—	—	13 0½	—	13 6½	15 6½
(Italian Rye) . . . "	—	—	17 7½	—	17 7½	19 11
Flax, . . . per 14 lbs.	—	—	7 9½	—	7 9½	6 11½
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
LIVE STOCK:—						
Calves (young) . . . per head	2 3 4	1 8 3	2 3 10	2 4 1	2 1 3	—
" (over 6 and not exceeding 12 months) . . . per head	5 11 6	4 3 10	5 2 2	4 13 8	4 13 10	—
Store Cattle—						
One year old and under two years . . . per head	8 15 5	7 6 0	7 9 1	8 2 9	7 19 2	7 8 2
Two years old and under three years . . . per head	12 1 5	9 0 3*	9 11 7	11 14 7	10 17 0	10 8 4
Three years old and over . . . "	14 17 10	9 5 2*	11 10 9	15 0 5	13 7 10	12 15 8
Fat Cattle—						
Two years old and under three years . . . per head	15 19 3	13 14 6	13 9 6	14 1 8	14 18 9	—
Three years old and over . . . "	17 13 8	16 1 4	15 4 3	16 10 5	16 17 10	—
Cows and Bulls . . . per head	15 1 1	13 7 2	12 0 0	13 3 7	13 13 2	—
Springers—						
Cows and Heifers . . . per head	15 13 10	13 15 5	14 14 3	15 19 3	15 5 1	14 10 1
Milk Cows (down calved) . . . "	13 14 5	13 1 1	13 15 6	13 10 2	13 11 8	—
Lambs (under 12 months old) . . . per head	1 4 5	1 2 8	1 1 6	1 1 5	1 3 1	1 0 7
Store Sheep—						
One year old and under two years . . . per head	1 12 4	1 3 4	1 2 2	1 13 3	1 10 4	1 11 10
Two years old and over . . . "	1 10 3	0 16 10*	1 0 4	1 16 11	1 10 10	1 10 6
Fat Sheep—						
One year old and under two years . . . per head	1 19 10	2 2 1	1 15 9	2 2 6	2 0 9	—
Two years old and over . . . "	1 18 5	1 12 8	1 16 2	2 6 5	1 19 6	—
Young Pigs—						
8 to 10 weeks old . . . per head	1 10 1	1 12 2	1 11 7	1 8 8	1 10 9	1 6 5
Under four months old . . . "	2 2 2	2 4 0	2 10 9	—	2 2 11	—
Fat Pigs, . . . "	4 5 3	4 9 7	6 4 8	—	4 8 4	—
Sows, . . . "	7 3 2	7 16 5	0 11 8	—	7 2 0	—
MEAT, PROVISIONS, &c	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Beef (Live) . . . per 112 lbs.	—	—	—	—	35 5	33 4
" (Dead), . . . "	—	—	—	—	62 0	58 4
Mutton (Live), . . . "	—	—	—	—	33 6	30 0
" (Dead), . . . "	—	—	—	—	58 8	52 6
Pork (Dead), . . . "	61 2	64 8	62 5	61 6	64 5	59 8
Butter (Creamery) . . . "	107 8	105 1	—	—	105 1	104 0
" (Factory), . . . "	94 7	92 2	—	—	92 3	90 1
" (Farmers), . . . "	91 8	90 9	90 1	92 3	90 11	88 6
Eggs, . . . per 120	9 1	8 2½	—	7 6½	8 6½	8 5½
Wool, . . . per lb.	0 10½	0 10½	—	0 10½	0 10½	0 9½

* Principally third class

WEEKLY AVERAGE PRICES of WHEAT, OATS, and BARLEY, per 112 lbs.
computed from Market Returns of certain quantities of these
Cereals supplied by Officers of Customs and Excise, during the QUARTER
ended 30th SEPTEMBER, 1910.

Returns received in the Week ended	WHEAT.		OATS.		BARLEY.	
	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.
1910.	s. d.	Cwts. of 112 lbs.	s. d.	Cwts. of 112 lbs.	s. d.	Cwts. of 112 lbs.
July, 2	—	—	6 3	2,405	—	—
" 9	—	—	6 3½	1,720	—	—
" 16	—	—	6 6	1,510	—	—
" 23	—	—	6 5½	1,728	—	—
" 30	—	—	6 2½	2,147	—	—
August, 6	—	—	6 2½	2,155	—	—
" 13	—	—	6 4½	1,812	—	—
" 20	—	—	6 2	1,917	—	—
" 27	—	—	6 3½	1,755	—	—
September, 3	—	—	5 9½	3,114	7 3	400
" 10	6 9	134	5 2½	14,632	7 0	400
" 17	7 5½	2,677	5 1½	19,786	6 6½	1,400
" 24	6 11	3,254	5 1½	28,098	7 0	11,524

QUARTERLY AVERAGE PRICES of FAT CATTLE and FAT SHEEP, per 112 lbs., LIVE
WEIGHT, sold in DUBLIN MARKETS during the period ended 30th
SEPTEMBER, 1910, and also for the corresponding period during
thirteen preceding years.

Year.	Fat Cattle.	Fat Sheep.	Year.
	£ s. d.	£ s. d.	
1910,	1 15 5	1 13 6	1910.
1909,	1 13 4	1 10 0	1909.
1908,	1 12 4	1 15 8	1908.
1907,	1 11 8	1 18 5	1907.
1906,	1 10 3	1 17 8	1906.
1905,	1 10 6	1 15 1	1905.
1904,	1 11 7	1 15 10	1904.
1903,	1 11 10	1 13 1	1903.
1902,	1 13 10	1 12 1	1902.
1901,	1 11 6	1 12 1	1901.
1900,	1 12 7	1 14 5	1900.
1899,	1 11 0	1 13 2	1899.
1898,	1 9 1	1 11 4	1898.
1897,	1 9 11	1 12 10	1897.

NUMBER OF ANIMALS INCLUDED IN RETURNS FURNISHED UNDER THE MARKETS AND FAIRS (Weighing of Cattle) ACT, 1891, SECTIONS 3 AND 4, DURING THE QUARTER ENDED 30TH SEPTEMBER, 1910.

WEEK ENDED	FAR CATTLE.				FAR SHEEP.			
	Dublin.		Belfast.		Dublin.		Belfast.	
	Corporation Market Authorities.	Mr. Gavin Low, Auctioneer.	Corporation Market Authorities.	Mr. John Robson, Auctioneer.	Total Number of Cattle included in Returns	Corporation Market Authorities.	Mr. Gavin Low, Auctioneer.	Corporation Market Authorities.
1910.								
July, 7	92	102	50	24	268	—	333	—
" 14	87	148	52	—	287	—	417	—
" 21	73	131	50	30	284	—	423	—
" 28	102	125	52	—	279	—	305	—
August, 4	98	180	59	—	337	—	278	—
" 11	83	151	57	33	324	—	457	—
" 18	85	183	61	28	357	—	269	—
" 25	103	100	53	—	256	—	172	—
Sept., 1	88	218	51	—	357	—	367	—
" 8	124	185	51	—	360	—	278	—
" 15	92	189	50	—	331	—	248	—
" 22	94	243	50	—	387	—	318	—
" 29	96	190	49	—	335	—	361	—
Totals.	1,217	2,145	685	115	4,162	—	4,226	—
								4,226

BUTTER PRICES DURING THE QUARTER

ABSTRACTED FROM "THE GROCER," "GROCER'S REVIEW,"

Excepting 1-lb. Rolls and Farmers' Butter all quotations are the
 an Irish Creamery would be 5s. to 7s. per cwt. less than
 freight, commission,

COUNTRY OF ORIGIN.	Type of Package	Place of Sale.	WEEK ENDED.			
			JULY.			
			2nd	9th	16th	23rd
IRELAND— Creamery Butter.	Kieis, hags, or pyramid boxes	London, ..	Per cwt. s. s. 106-109	Per cwt. s. s. 106-109	Per cwt. s. s. 106-109	Per cwt. s. s. 104-109
		Liverpool, ..	105-107	106-108	104-109	106-108
		Bristol, ..	108-110	108-110	108-110	108-109
		Cardiff, ..	107-108	109-111	108-111	107-109
		Manchester, ..	106-111	106-111	106-111	105-110
		Birmingham, ..	106-109	106-109	106-108	105-109
		Glasgow, ..	107-108	107-108	107-108	107-108
		Limerick, ..	-	-	-	-
		Cork, ..	-	-	-	-
		Belfast, ..	-	-	-	-
	1lb rolls, in boxes, Salted or unsalted	Dublin, ..	106-107 4	107 4-109 4	105-107 4	105-107 4
		F. O. R., ..	107 4-116 8	107 4-116 8	107 4-116 8	107 4-116 8
	Factories,	London, ..	96-105	96-105	93-105	92-100
		Liverpool, ..	98-102	98-102	98-102	96-98
		Bristol, ..	96-100	96-100	96-100	98
		Cardiff, ..	102-105	98-104	98-107	96-107
		Manchester, ..	-	-	-	-
Farmers' Butter, ..	Firkins 1st, Ex- port Price	Cork, ..	90-91	89-90	90-91	89-90
	Do. 2nd "	Cork, ..	88-90	88-89	88-90	88-89
	Do. 3rd "	Cork, ..	86-87	86	86-87	87
	Fresh, ..	Cork, ..	88-95	86-94	86-94	86-95
FRANCE,	12 x 2lb. rolls,	London, ..	Per doz lbs 10-13 Per cwt.	Per doz lbs. 10-13 Per cwt.	Per doz. lbs. 10-13 Per cwt.	Per doz. lbs 10-13 Per cwt.
	Paris baskets,	do., ..	102-110	102-110	102-110	102-110
DENMARK AND SWEDEN.	Kieis, ..	Copenhagen Quotation, {	97 Kr. 108/7 per 60 Kilos	97 Kr. 108/7 per 60 Kilos	96 Kr. 107/6 per 50 Kilos	96 Kr. 107/6 per 50 Kilos
		Average over- price.	-	-	-	-
		London, ..	114-116	114-116	113-115	113-115
		Liverpool, ..	118-120	119-121	116-120	117-119
		Bristol, ..	-	-	-	-
		Cardiff, ..	118-120	119-120	118-119	118-119
		Manchester, ..	114-118	114-118	112-117	113-117
		Birmingham, ..	115-118	116-118	115-118	114-117 6
		Newcastle-on- Tyne.	114-116	115-117	114-116	113-116
		Glasgow, ..	116-118	116-118	115-117	115-117
	1lb. rolls, 10 x 2 1/2 lb. boxes.	Leith, ..	116-117	116-117	116-117	114-116
		Hull, ..	114-116	116-117	114-116	115-117
		F. O. R. London	-	-	-	-
FINLAND,	Kieis, ..	Manchester, ..	110-114	110-114	108-113	108-112
		Liverpool, ..	114-116	-	-	-
		Hull, ..	-	112-116	111-114	112-116
		Cardiff, ..	115-116	116	115	116-117

ENDED 30TH SEPTEMBER, 1910.

"GROCER'S GAZETTE," AND OTHER TRADE REPORTS.

Landed Prices of the Choicest Qualities. The Nett F.O.R. Price to the landed Prices in Great Britain. This figure covers handling, &c.

WEEK ENDED								
AUGUST.					SEPTEMBER.			
30th	6th	13th	20th	27th	3rd	10th	17th	24th
Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.
s. s.	s. s.	s. s.	s. s.	s. s.	s. s.	s. s.	s. s.	s. s.
104-109	106-110	106-110	106-112	110-114	110-115	112-115	112-115	112-116
108-109	108-109	106-110	107-111	109-112	112-115	113-115	113-115	113-115
108-110	108-112	108-112	109-112	111-115	113-116	113-116	114-118	114-118
109-110	109-111	108-110	109-112	112-114	115-117	115-116	116-118	116-117
107-111	107-113	107-113	108-114	110-116	112-117	112-117	113-117	112-116
107-109	108-110	107-110	108-111	111-114	113-115	112-114	114-116	114-117
106-108	108-109	108-109	108-109	110-112	113-114	113-114	113-114	114-115
-	-	-	-	-	-	-	-	-
105-107/4	105-107 4	105-107 4	105-107 4	110-112	112-114	112-114	112-114	112-114
112-116/8	112-119	112-119	112-119	116/8-119	116 8-121 4	116 8-121 4	121 4-126	121 4-126
92-105	92-105	92-100	92-102	96-104	96-104	98-106	96-106	98-106
95-100	96-100	98-102	96-102	98-104	98-104	98-103	98-103	100-104
96-102	96-102	96-102	96-102	96-102	98-103	98-103	98-104	98-104
103-106	98-102	96-104	98-100	100-104	98-104	98-104	98-105	98-104
-	-	-	-	-	-	-	-	-
89-91	89-91	90-91	90-91	92-94	94	94-96	96	96-99
88-90	88-90	88-89	87-88	88-90	89-90	90-93	92-93	93-96
86-87	86	85	85	85-89	88	88	89-90	90-92
96-94	86-93	86-92	84-93	85-100	90-100	89-100	91-101	91-101
Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.
10-13	10-13	10-13	10-13	10-13	10-13/6	10/6-13/6	11-14	11-14
Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.
102-110	102-110	102-110	102-110	102-110	106-114	107-116	112-121	112-120
96 Kr. 50	94 Kr. 50	95 Kr. 50	97 Kr. 50	99 Kr. 50	98 Kr. 50	98 Kr. 50	98 Kr. 50	97 Kr. 50
107/6 per cwt.	105/3 per cwt.	106/4 per cwt.	108/7 per cwt.	110/10 per cwt.	109/9 per cwt.	109/8 per cwt.	109/10 per cwt.	108/10 per cwt.
Kils	Kils	Kils	Kils	Kils	Kil	Kils	Kils	Kils
113-115	111-114	113-115	115-116	117-120	116-118	116-118	116-118	116-117
116-119	112-120	114-118	116-119	118-121	120-124	118-122	118-122	119-121
-	-	-	-	-	-	-	-	-
118-119	118-119	116-117	117-118	119-120	121-122	120-121	119-121	120-121
114-119	112-117	111-117	112-119	115-122	116-121	114-118	116-119	116-119
115-117	115-117/6	114-117	115-117/6	116/6-120	118/6-121/6	117-120	118-121	118-121
-	-	-	-	-	-	-	-	-
114-116	114-116	113-115	114-116	116-120	118-120	116-118	116-119	116-119
115-117	115-117	114-115	116-117	118-119	119-120	117-118	118-119	117-118
115	114/6-115	112-112/6	114-114/6	117	119	117	116-117	117
114-117	115-118	114-118	114-118	116-118	116-118	116-118	120-122	115-117
-	-	-	-	-	-	-	-	-
108-113	109-113	108-112	110-115	112-119	114-117	113-115	114-116	114-116
-	-	-	-	-	-	-	-	-
112-114	113-116	112-116	112-116	114-116	114-116	115-117	118-120	113-115
113-115	115	113	114	116	118	117	116-117	117

(Continued on Pages 204-205)

BUTTER PRICES DURING THE QUARTER,
ABSTRACTED FROM "THE GROCER," "GROCER'S REVIEW,"

Excepting 1 lb Rolls and Farmers' Butter all quotations are the
 an Irish Creamery would be 5s to 7s. per cwt. less than
 freight, commission,

WILL LINDF

COUNTRY OF ORIGIN	Type of Package	Place of Sale	PRICE			
			2nd	1st	16th	21st
			Per cwt	Per cwt	Per cwt	Per cwt
RUSSIA AND SIBERIA	Kills,	London	96 100	98-102	98-102	98-102
		Liverpool,	101-103	100-106	98-105	98-104
		Bristol,	103 106	103 106	104 106	103 106
		Cardiff	106 108	103 108	104-106	106-108
		Manchester	100-103	100 103	100-104	100-104
		Birmingham,	100-103	100-103	100 112	98 103
		Glasgow,	98 102	98-102	100 114	102
		Lith,	100	100	98	100
		Hull,				
HOLLAND	Boxes	London,	106	106 110	106-108	106 108
	Rolls	do	Per doz lbs 12 6	Per doz lbs 12 12 6	Per doz lbs 12 6-12/9	Per doz lbs 12/6 13
	Boxes,	Glasgow				
		Fresh	110 111	110-111	111-112	110 111
		Salt	107 108	107 108	108 109	107 105
		Manchester	106 108	106 108	-	-
		Hull	110-112	108 113	112-114	113 114
ITALY	Rolls	London	Per doz lbs 12 13	Per doz lbs 12 13	Per doz lbs 12-13	Per doz lbs 12-13
CANADA	6lb boxes	London				
		Liverpool				
		Bristol	113	113	113	113
		Cardiff	112 113	111 115	114 11	111 114
		Birmingham	-	-	-	-
		Glasgow	-	-	-	-
AUSTRALIA AND NEW ZEALAND *	Boxes,	London,	A — 100-104	A 100-104	A 102-114	A 102 104
		Liverpool	/ 108-110	Z 108-110	Z 108-110	/ 102 104
		Bristol,	A 103-105	A 103 105	A 103 105	A 103 105
		Cardiff,	/ 109 110	Z 109-110	/ -	/ -
		Manchester,	A 102 110	A 104-110	A 104-110	A 106 110
		Birmingham	Z 110 115	Z 112-116	Z 110-116	Z 115
		Glasgow,	A 104 108	A -	A -	A -
		Lith	A -	A -	A -	A -
		Hull,	A -	A -	A -	A -
			Z -	Z -	Z -	Z -
ARGENTINA	Boxes,	London	-	-	-	-
		Liverpool,	103-105	103-105	103-105	-
		Bristol	-	-	-	-
		Cardiff,	107	102	107-108	107 108
		Manchester	-	-	-	-
		Birmingham Glasgow	-	-	-	-
UNITED STATES	Tubs & boxes	London,	-	-	-	-
		Liverpool,	-	-	-	-
		Bristol	-	-	-	-
		Cardiff	-	-	-	-
		Manchester,	-	-	-	-

* A—Australia

/ — New Zealand

s — salted

u. — unsalted

ENDED 30TH SEPTEMBER, 1910.—continued.

"GROCER'S GAZETTE," AND OTHER TRADE REPORTS.

Landed Prices of the Choicest Qualities. The Nett F.O.R. Price to the landed prices in Great Britain. This figure covers handling, &c.

WEEK ENDED.								
AUGUST.					SEPTEMBER.			
30th	6th	13th	20th	27th	3rd	10th	17th	24th
Per cwt. 8-102 98-104 104-106 107-108 100-104 98-104 100-102 100	Per cwt. 98-102 98-104 104-108 102-106 100-104 98-104 100-102 98	Per cwt. 100-104 100-104 104-108 106 100-105 98-104 100-102 100	Per cwt. 102-106 98-106 104-110 98-106 102-107 104-109 102-107 100	Per cwt. 104-106 100-107 104-110 106-109 104-109 102-107 102-104 104	Per cwt. 104-106 100-109 105-112 102-106 106-108 103-108 104-106 104	Per cwt. 106-106 102-108 105-112 106-111 105-109 104-108 104-106 106	Per cwt. 106-108 106-108 104-112 102-110 106-110 104-110 106-108 104	Per cwt. 106-108 106-108 104-112 106-112 106-109 104-109 106-108 104
100-109 Per doz. lbs. 12/6-13 Per cwt.	108-110 Per doz. lbs. 12/6-13 Per cwt.	108 Per doz. lbs. 12/6-13 Per cwt.	110-112 Per doz. lbs. 12/6-13 Per cwt.	114-116 Per doz. lbs. 12/6-13 Per cwt.	114 Per doz. lbs. 13-13/6 Per cwt.	112-114 Per doz. lbs. 13-13/6 Per cwt.	115-116 Per doz. lbs. 13-13/6 Per cwt.	112-114 Per doz. lbs. 13-13/6 Per cwt.
111-112 108-109 110-112	111-112 108-109 113-116	110-111 107-108 113-116	112-113 106-110 113-116	116-117 112-114 118-120	116-117 112-114 117-120	115-116 110-112 118-121	115-116 110-112 119-121	114-115 109-111 116-118
Per doz. lbs. 12-13	Per doz. lbs. 12-13	Per doz. lbs. 12-13	Per doz. lbs. 12-13	Per doz. lbs. 12-13	Per doz. lbs. 12/6-13/6	Per doz. lbs. 12/6-13/6	Per doz. lbs. 12/6-13/6	Per doz. lbs. 13-14
Per cwt. 112 112-114	Per cwt. 112-114 111-113	Per cwt. 112-116 111-115	Per cwt. 112-116 112-114	Per cwt. 114-117 113/6-115	Per cwt. 114-116 113-115 114-118 114-116	Per cwt. 113-115 114-118 115-116	Per cwt. 114-116 113-115 115-120 115-116	Per cwt. 113-115 113-115 115-120 115-116
A. Z. 102-104 Z. - A. - Z. - A. 104-108 Z. 112-116 A. 106 Z. 112-114 A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. -	A. Z. - Z. - A. - Z. - A. 106-110 Z. 113-116 A. - Z. 112-114 A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. -	A. Z. - Z. - A. - Z. - A. 105-110 Z. 113-116 A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. -	A. Z. - Z. - A. - Z. - A. 105-110 Z. 116-118 A. - Z. 114-116 A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. -	A. Z. - Z. - A. - Z. - A. 106-110 Z. 116-118 A. - Z. 116 A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. -	A. Z. 98-112 Z. - A. - Z. - A. 107-111 Z. 116-120 A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. -	A. Z. 108-112 Z. - A. - Z. - A. 107-111 Z. 116-120 A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. -	A. Z. 114-116 Z. - A. - Z. - A. 108-114 Z. 116-120 A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. -	A. Z. 114-116 Z. 116 A. - Z. - A. 108-114 Z. 116-120 A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. - A. - Z. -
107-108	107-108	107-108	108-109					

TABLES SHOWING THE EXPORTS

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT
the PORTS of EMBARKATION

IRISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing)	Milch Cows	Spring- ers.	Other Cattle	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ballina, . . .	84	10	-	1	156	-	251	401	-	4,389	4,790
Belfast, . . .	7,252	26,915	2,310	3,493	6	236	40,212	882	9	16,517	17,408
Coleraine, . . .	32	498	3	-	2	-	535	101	-	294	398
Cork, . . .	1,984	14,795	894	1,603	411	7,321	27,008	2,720	774	28,583	32,077
Drogheda, . . .	6,366	2,334	84	3	-	-	8,787	9,941	-	15,237	25,178
Dublin, . . .	45,635	33,692	10,217	1,877	324	1,487	93,232	70,205	-	110,871	181,176
Dundalk, . . .	822	4,184	305	164	-	-	5,475	6,209	30	13,798	20,037
Dundrum, . . .	-	9	5	4	-	-	18	-	-	-	-
Greenore, . . .	41	3,181	656	1,303	-	1	5,182	7,503	-	7,588	15,091
Larne, . . .	136	6,572	-	161	-	22	6,891	-	535	1,761	2,296
Limerick, . . .	11	194	-	-	181	37	426	-	30	18	48
Londonderry, . . .	1,188	15,009	487	1,553	112	695	19,044	1,447	4,964	14,016	20,427
Millford, . . .	17	122	-	1	6	-	140	-	-	-	-
Mulroy, . . .	-	5	-	-	1	-	6	4	-	2	6
Newry, . . .	1	1,782	29	8	-	-	1,820	1,011	49	3,205	4,265
Portrush, . . .	1	1	-	1	-	1	4	-	-	23	23
Rosslare, . . .	-	-	-	-	-	-	-	-	-	-	-
Silgo, . . .	200	151	3	10	109	-	473	301	-	5,652	5,953
Warrenpoint, . . .	-	-	-	-	-	-	-	-	-	-	-
Waterford, . . .	5,814	14,484	56	100	116	748	21,318	6,443	-	25,350	31,993
Westport, . . .	93	13	7	12	271	-	396	3,135	-	5,425	8,560
Wexford, . . .	220	555	-	-	-	-	775	1,620	-	3,600	8,220
TOTAL, . . .	69,897	124,506	15,056	10,294	1,698	10,548	231,999	115,126	6,391	256,429	377,946

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT
the PORTS of DEBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing)	Milch Cows	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ardrossan, . . .	2,252	4,187	958	691	-	4	8,072	15	1	236	252
Ayr, . . .	2,820	14,004	270	560	5	196	17,855	-	400	2,150	2,550
Barrow, . . .	43	508	105	587	-	-	1,243	-	-	72	72
Bristol, . . .	795	5,979	233	373	-	2,012	9,392	2,487	47	7,412	9,946
Dover, . . .	-	1	-	-	-	-	1	-	-	-	-
Fishguard, . . .	2,781	17,202	539	809	-	4,068	25,459	2,898	727	21,964	25,579
Fleetwood, . . .	343	3,712	580	419	-	27	5,081	805	2,381	10,956	14,142
Glasgow, . . .	11,674	23,800	709	1,597	1,137	1,283	40,200	1,347	38	7,950	9,335
Greenock, . . .	85	4,071	7	25	-	-	4,188	10	55	188	253
Heysham, . . .	1,692	9,972	2,481	1,219	41	76	15,451	2,077	2,009	2,368	6,454
Holyhead, . . .	7,185	17,491	1,902	1,501	88	589	28,756	28,540	-	34,083	62,623
Liverpool, . . .	23,465	15,891	7,265	2,198	427	2,185	56,431	70,604	598	159,050	230,252
London, . . .	-	-	-	-	-	-	-	-	-	-	-
Manchester, . . .	6,512	-	10	3	-	-	6,525	5,734	-	9,172	14,906
Newhaven, . . .	-	90	-	3	-	20	113	-	-	-	-
Plymouth, . . .	689	79	1	-	-	20	789	1	-	-	1
Preston, . . .	1,088	-	6	5	-	-	1,099	159	-	-	159
Silloth, . . .	3,318	1,709	-	-	-	12	5,039	152	-	271	423
Southampton, . . .	35	201	5	88	-	34	363	297	-	32	329
Stranraer, . . .	130	5,820	-	152	-	22	5,924	-	135	535	670
Whitehaven, . . .	-	9	5	4	-	-	18	-	-	-	-
TOTAL, . . .	69,897	124,506	15,056	10,294	1,698	10,548	231,999	115,126	6,391	256,429	377,946

AND IMPORTS OF ANIMALS.

I.

BRITAIN during the Three Months ended 30th SEPTEMBER, 1910, showing in Ireland.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals	IRISH PORTS.
Fat.	Stores.	Total.		Stallions.	Mares.	Geldings.	Total.				
402	1	403	-	-	-	-	-	-	-	5,444	Ballina.
858	740	1,598	75	5	608	1,081	1,694	2	13	61,002	Belfast.
37	2	39	1	1	-	1	2	-	-	976	Coleraine.
2,271	33	2,304	-	4	336	433	778	1	147	62,310	Cork.
362	307	669	7	-	3	5	8	-	-	34,640	Drogheda.
14,890	249	15,139	16	124	1,667	1,488	3,279	4	115	292,961	Dublin.
1,088	1,293	2,381	322	1	242	125	368	1	270	28,854	Dundalk.
-	-	-	1	-	-	-	-	-	-	19	Dundrum.
150	190	349	18	1	1,007	575	1,583	-	3	22,228	Greenore.
35	984	1,019	1	2	42	106	150	2	2	10,359	Larne.
-	-	-	-	-	-	-	-	-	-	478	Limerick.
237	66	303	1	-	31	38	69	-	-	39,866	Londonderry.
57	-	57	-	-	-	3	3	-	-	266	Milford.
171	-	171	-	-	-	-	-	-	1	184	Mulroy.
104	18	122	1	-	4	4	8	-	-	6,216	Newry.
5	-	5	-	-	1	1	2	-	-	34	Portrush.
-	-	-	-	-	11	21	33	-	-	37	Rossare.
3,636	-	3,636	4	1	3	-	3	-	2	10,067	Sligo.
-	-	-	-	-	-	-	-	-	-	-	Warrenpoint.
2,201	-	2,201	2	3	329	457	789	-	123	56,426	Waterford.
494	-	494	1	-	3	1	4	-	-	9,455	Westport.
371	-	371	-	-	1	2	3	-	-	9,860	Wexford.
27,398	3,883	31,281	450	142	4,288	4,345	8,775	8	679	651,138	TOTAL.

BRITAIN during the Three Months ended 30th SEPTEMBER, 1910, showing in GREAT BRITAIN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals	BRITISH PORTS.
Fat.	Stores.	Total.		Stallions.	Mares.	Geldings.	Total.				
51	839	890	-	1	23	93	117	-	-	9,331	Aldersan.
100	942	1,042	64	3	23	58	84	-	3	21,598	Ayr.
511	7	518	1	-	20	44	64	-	-	1,898	Barrow.
490	-	490	1	1	72	196	179	-	91	20,069	Bristol.
-	-	-	-	-	-	-	-	-	-	1	Dover.
357	-	357	4	5	522	711	1,238	1	91	52,729	Fishguard.
156	153	309	-	-	296	415	711	-	8	20,251	Fleetwood.
2,812	21	2,833	5	3	144	343	490	2	5	52,870	Glasgow.
2	30	32	-	-	7	7	14	-	-	4,487	Grenock.
3,361	20	3,381	6	1	146	291	438	-	2	25,732	Heysham.
9,294	190	9,484	23	123	2,113	1,543	3,779	-	10	104,676	Holyhead.
9,927	1,325	11,252	341	3	687	477	1,167	5	463	299,911	Liverpool.
-	-	-	-	-	12	10	22	-	-	22	London.
193	-	193	2	-	88	52	140	-	3	21,760	Manchester.
-	-	-	-	-	4	6	10	-	-	123	Newhaven.
-	-	-	-	-	16	28	44	-	1	835	Plymouth.
130	-	130	-	-	-	-	-	-	-	1,368	Preston.
-	-	-	-	-	18	26	44	-	-	5,506	Silloth.
40	-	40	1	-	56	30	86	-	-	819	Southampton.
4	366	360	1	2	41	105	148	-	2	7,105	Stranraer.
-	-	-	1	-	-	-	-	-	-	19	Whitehaven.
27,398	3,883	31,281	450	142	4,288	4,345	8,775	8	679	651,138	TOTAL.

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT
the PORTS OF

IRISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ballina,	-	-	-	-	-	-	-	-	2	-	2
Belfast,	-	1	3	2	1	5	12	59	2,796	152	3,007
Coleraine,	-	-	-	-	-	-	-	-	113	-	113
Cork,	-	3	-	-	-	-	3	87	6	-	93
Drogheda,	-	-	-	-	-	-	-	-	-	-	-
Dublin,	-	6	5	-	-	-	11	44	3,766	1,418	5,228
Dundalk,	-	-	-	-	1	-	1	-	-	-	-
Dundrum,	-	-	-	-	-	-	-	-	-	-	-
Greenore,	-	-	-	-	-	-	-	-	-	-	-
Larne,	-	1	-	-	-	-	1	-	678	182	860
Limerick,	-	10	-	-	-	-	10	-	-	-	-
Londonderry,	-	1	-	3	-	-	4	-	39	562	601
Millford,	-	-	-	-	-	-	-	-	-	-	-
Mulroy,	-	-	-	-	-	-	-	-	-	-	-
Newry,	-	-	-	-	-	-	-	-	-	-	-
Portrush,	-	-	-	-	-	-	-	-	-	91	91
Rosslare,	-	-	-	-	-	-	-	-	10	-	10
Sligo,	-	-	-	-	-	-	-	15	-	-	15
Warrenpoint,	-	-	-	-	-	-	-	-	-	-	-
Waterford,	-	2	-	-	-	-	2	-	45	-	45
Westport,	-	-	-	-	-	-	-	-	-	2	2
Wexford,	-	-	-	-	-	-	-	-	-	-	-
TOTAL,	-	24	8	5	2	5	44	205	7,455	2,497	10,067

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT
the PORTS OF EMBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ardrossan,	-	-	3	-	-	5	8	-	166	111	277
Ayr,	-	-	-	2	-	-	2	59	2,819	182	3,060
Barrow,	-	-	-	-	-	-	-	-	-	-	-
Bristol,	-	3	-	-	-	-	3	-	27	-	27
Cardiff,	-	-	-	-	-	-	-	-	-	-	-
Fishguard,	-	1	-	-	-	-	1	62	10	-	72
Fleetwood,	-	-	-	-	-	-	-	-	6	-	6
Glasgow,	-	13	-	3	1	-	17	15	1,577	1,799	3,301
Greenock,	-	-	-	-	-	-	-	-	194	109	303
Heysham,	-	-	-	-	-	-	-	-	5	2	7
Holyhead,	-	5	5	-	-	-	10	-	52	3	55
Liverpool,	-	1	-	-	1	-	2	-	3	-	3
London,	-	-	-	-	-	-	-	-	-	-	-
Manchester,	-	-	-	-	-	-	-	44	-	-	44
Newhaven,	-	-	-	-	-	-	-	-	-	-	-
Plymouth,	-	-	-	-	-	-	-	25	-	-	25
Preston,	-	-	-	-	-	-	-	-	-	-	-
Silloth,	-	-	-	-	-	-	-	-	2,115	251	2,366
Southampton,	-	-	-	-	-	-	-	-	-	-	-
Stranraer,	-	1	-	-	-	-	1	-	480	40	520
Whitehaven,	-	-	-	-	-	-	-	-	-	-	-
TOTAL,	-	24	8	5	2	5	44	205	7,455	2,497	10,067

III.

BRITAIN during the Three Months ended 30th SEPTEMBER, 1910, showing
DEBARKATION IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
-	-	-	-	-	-	-	-	-	-	2	Ballina.
-	-	-	1	15	175	216	406	-	1	3,427	Belfast.
-	-	-	-	-	4	4	8	-	-	121	Coleraine.
-	-	-	-	1	51	60	121	-	-	217	Cork.
-	-	-	-	-	1	2	3	-	-	3	Drogheda.
-	-	-	1	61	566	282	909	-	1	6,150	Dublin.
-	-	-	-	-	1	1	2	-	-	3	Dundalk.
-	-	-	-	-	-	-	-	-	-	-	Dundrum.
-	-	-	-	1	36	24	61	-	1	62	Greenore.
-	-	-	-	4	37	20	61	-	-	922	Larne.
-	-	-	-	-	-	-	-	-	-	10	Limerick.
-	-	-	-	-	6	3	9	-	-	614	Londonderry.
-	-	-	-	-	-	-	-	-	-	-	Millford.
-	-	-	-	2	2	3	7	-	-	7	Malroy.
-	-	-	-	-	2	-	2	-	-	93	Newry.
-	-	-	2	1	5	6	12	-	-	24	Portrush.
-	-	-	-	-	1	1	2	-	-	17	Rosslare.
-	-	-	-	-	-	-	-	-	-	-	Silgo.
-	-	-	-	-	38	36	74	-	-	121	Warrenpoint.
-	-	-	-	-	-	-	-	-	-	2	Waterford.
-	-	-	-	-	-	1	1	-	-	1	Westport.
-	-	-	-	-	-	-	-	-	-	-	Wexford.
-	-	-	4	85	925	668	1,678	-	3	11,796	TOTAL.

IV.

BRITAIN during the Three Months ended 30th SEPTEMBER, 1910, showing
in Great Britain.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals	BRITISH PORTS
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
-	-	-	-	6	55	29	90	-	-	375	Ardrossan.
-	-	-	-	9	80	111	200	-	-	3,262	Ayr.
-	-	-	-	-	-	-	-	-	-	-	Barrow.
-	-	-	-	-	41	61	102	-	-	132	Bristol.
-	-	-	-	-	-	-	-	-	-	-	Cardiff.
-	-	-	2	1	45	39	85	-	-	160	Fishguard.
-	-	-	-	1	33	56	90	-	-	-	Fleetwood.
-	-	-	-	-	11	23	34	-	-	3,352	Glasgow.
-	-	-	-	-	6	7	13	-	-	316	Greenock.
-	-	-	-	-	4	0	13	-	-	20	Heysham.
-	-	-	1	16	334	229	609	-	2	677	Holyhead.
-	-	-	1	4	17	24	45	-	1	52	Liverpool.
-	-	-	-	-	4	2	6	-	-	6	London.
-	-	-	-	-	1	1	2	-	-	46	Manchester.
-	-	-	-	-	-	-	-	-	-	-	Newhaven.
-	-	-	-	-	1	3	4	-	-	20	Plymouth.
-	-	-	-	-	-	-	-	-	-	-	Preston.
-	-	-	-	14	253	54	321	-	-	2,687	Silloth.
-	-	-	-	-	3	-	3	-	-	4	Southampton.
-	-	-	-	4	37	20	61	-	-	582	Stranraer.
-	-	-	-	-	-	-	-	-	-	-	Whitehaven.
-	-	-	4	85	925	668	1,678	-	3	11,796	TOTAL.

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, .	—	246	—	5	251	—	257	257
DUBLIN, .	326	85	—	3	414	143	1,712	1,855
TOTAL, .	326	331	—	8	665	143	1,969	2,112

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the
showing the PORTS of DEBARKATION

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, .	326	331	—	8	665	143	1,969	2,112

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, .	—	—	—	—	—	—	—	—
DUBLIN, .	—	—	—	—	—	—	—	—
TOTAL, .	—	—	—	—	—	—	—	—

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the
showing the PORTS of EMBARKATION

ISLE OF MAN PORT.	CATTLE.					SHEEP		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, .	—	—	—	—	—	—	—	—

ISLE OF MAN during the Three Months ended 30th SEPTEMBER, 1910,
EMBARKATION in IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stallions.	Mares.	Geldings.	Total.				
-	-	-	-	-	5	30	35	-	-	543	BELFAST.
-	1	1	-	-	-	-	-	-	-	2,270	DUBLIN.
-	1	1	-	-	5	30	35	-	-	2,813	TOTAL.

ISLE OF MAN during the Three Months ended 30th SEPTEMBER, 1910,
in the ISLE OF MAN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stallions.	Mares.	Geldings.	Total.				
-	1	1	-	-	5	30	35	-	-	2,813	DOUGLAS.

ISLE OF MAN during the Three Months ended 30th SEPTEMBER, 1910,
DEBARKATION in IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stallions.	Mares.	Geldings.	Total.				
-	-	-	-	1	1	1	3	-	-	3	BELFAST.
-	-	-	-	-	-	-	-	-	-	-	DUBLIN.
-	-	-	-	1	1	1	3	-	-	3	TOTAL.

ISLE OF MAN during the Three Months ended 30th SEPTEMBER, 1910,
in the ISLE OF MAN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stallions.	Mares.	Geldings.	Total.				
-	-	-	-	1	1	1	3	-	-	3	DOUGLAS.

COASTING AND

RETURN of the NUMBER of ANIMALS SHIPPED to and from Places in
the Places of Embarkation

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Cork to Aghada Pier, .	-	-	-	-	-	1	5	6	-	-	-
" to Belfast, .	-	55	-	30	85	-	-	-	-	-	-
" to Spike Island, .	-	-	-	-	-	-	-	-	-	-	-
" to Queenstown, .	-	-	-	-	-	-	-	-	-	-	-
" to Waterford, .	-	3	-	38	41	-	-	-	-	-	-
Total, . .	-	58	-	68	126	1	5	6	-	-	-
Aghada Pier to Cork, .	-	-	-	-	-	-	125	125	135	-	135
Belfast " .	-	-	-	-	-	-	-	-	-	-	-
Spike Island " .	-	-	-	-	-	-	-	-	-	-	-
Queenstown " .	-	-	-	-	-	-	-	-	-	-	-
Waterford " .	-	1	-	-	1	1	-	1	-	-	-
Total, . .	-	1	-	-	1	1	125	126	135	-	135
Waterford to Ballyhack, .	-	11	-	6	17	2	-	2	-	-	-
" to Belfast, .	15	-	-	15	15	-	30	30	-	-	-
" to Duncannon, .	-	38	-	25	63	9	-	9	-	15	15
Total, . .	15	40	-	31	95	11	30	41	-	15	15
Ballyhack to Waterford, .	25	12	-	-	37	177	267	444	35	-	35
Limerick to Kilrush, .	-	-	-	-	-	-	-	-	-	-	-
Duncannon to Waterford, .	7	-	-	-	7	71	32	103	175	-	175
Kilrush to Limerick, .	-	90	1	3	94	13	-	13	2,815	-	2,815
Banagher " .	-	-	-	-	-	-	-	-	-	-	-
Glin, " .	-	-	-	-	-	-	-	-	-	-	-
Portumna, " .	-	-	-	-	-	-	-	-	200	-	200
Kildysart, " .	-	-	-	-	-	-	-	-	-	-	-
Kilkee, " .	-	-	-	-	-	-	-	-	-	-	-
Total, . .	-	90	1	3	94	13	-	13	3,015	-	3,015
Greencastle to Greenore, .	-	6	-	-	6	-	304	304	-	-	-
Greenore to Greencastle, .	-	-	-	-	-	-	-	-	-	-	-
Londonderry to Moville, .	-	-	-	-	-	-	4	4	7	-	7
Moville to Londonderry, .	-	246	-	12	258	30	84	114	-	-	-
Ballina to Sligo, .	-	-	-	-	-	-	-	-	-	-	-
Belmullet " .	-	1	4	-	5	-	110	110	680	-	680
Total, . .	-	1	4	-	5	-	110	110	680	-	680
Mulroy to Milford, .	-	6	-	-	6	-	-	-	-	-	-
Leithbeg to Mulroy, .	-	-	-	-	-	-	-	-	-	-	-
Milford to Mulroy, .	-	3	-	-	3	-	6	6	-	3	3
Mulroy to Portrush, .	-	-	-	-	-	-	-	-	-	-	-
Londonderry to Mulroy, .	-	-	-	-	-	-	-	-	-	1	1
Total, . .	47	472	5	114	638	304	967	1,271	4,047	19	4,066

INLAND NAVIGATION.

Ireland during the Three Months ended 30th SEPTEMBER, 1910, showing and Debarkation.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
-	-	-	-	-	-	-	6	Cork to Aghada Pier.
-	-	1	4	5	-	-	90	" to Belfast
-	-	-	-	-	-	-	-	" to Spike Island.
-	-	-	3	3	-	-	44	" to Queenstown.
-	-	-	-	-	-	-	-	" to Waterford.
-	-	1	7	8	-	-	140	Total.
1	-	-	-	-	-	-	261	Aghada Pier to Cork
-	-	-	-	-	-	-	-	Belfast
-	-	-	-	-	-	-	-	Spike Island "
-	-	-	1	1	-	-	3	Queenstown "
-	-	-	-	-	-	-	-	Waterford "
1	-	-	1	1	-	-	264	Total.
-	-	-	1	1	-	2	22	Waterford to Ballyhack.
-	-	1	-	1	-	-	46	" to Belfast.
-	-	3	-	3	-	1	91	" to Duncannon.
-	-	4	1	5	-	3	159	Total.
-	-	-	-	-	-	-	516	Ballyhack to Waterford.
-	-	-	-	-	-	-	-	Limerick to Kilrush.
-	-	1	1	2	-	1	284	Duncannon to Waterford.
-	-	-	-	-	-	-	2,022	Kilrush to Limerick.
-	-	-	-	-	-	-	-	Banagher "
-	-	-	-	-	-	-	-	Olin "
-	-	-	-	-	-	-	200	Portumna "
-	-	-	-	-	-	-	-	Kildysart "
-	-	-	-	-	-	-	-	Kilkee "
-	-	-	-	-	-	-	3,122	Total.
-	-	-	-	-	-	-	310	Greencastle to Greenore.
-	-	-	-	-	-	-	-	Greenore to Greencastle.
-	-	-	-	-	-	-	11	Londonderry to Moville.
-	-	-	-	-	-	-	372	Moville to Londonderry.
-	-	1	-	1	-	-	1	Ballina to Sligo.
-	-	-	-	-	-	-	795	Belmullet "
-	-	1	-	1	-	-	796	Total.
-	-	-	-	-	-	1	7	Mulroy to Milford
-	-	-	-	-	-	-	-	Leithbeg to Mulroy.
-	-	-	-	-	-	-	12	Milford to Mulroy.
-	-	-	-	-	-	-	-	Mulroy to Portrush.
-	-	-	-	-	-	-	1	Londonderry to Mulroy.
1	-	7	10	17	-	5	5,998	Total.

RETURN of the NUMBER of HORSES EXPORTED from IRELAND through GREAT BRITAIN to the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 30th SEPTEMBER, 1910, showing the Ports of Embarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast,	—	190	121	311
Cork,	—	3	4	7
Dublin,	5	244	130	379
Dundalk,	—	93	47	140
Greenore,	—	445	191	636
Waterford,	1	9	47	57
Total,	6	984	540	1,530

RETURN of the NUMBER of HORSES IMPORTED into IRELAND through GREAT BRITAIN from the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 30th SEPTEMBER, 1910, showing the Ports of Debarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast,	11	89	49	149
Dublin,	15	207	55	277
Waterford,	—	—	—	—
Total,	26	296	104	426

RETURN of the NUMBER of HORSES IMPORTED into IRELAND direct from FOREIGN COUNTRIES during the THREE MONTHS ended 30th SEPTEMBER, 1910, showing the Ports of Debarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Dublin,	—	—	—	—
Portrush,	—	—	—	—
Total,	—	—	—	—

DISEASES OF ANIMALS IN IRELAND.

NUMBER OF OUTBREAKS of SWINE FEVER, and NUMBER of SWINE returned as having been SLAUGHTERED in Ireland, under the Diseases of Animals Act of 1894, in the undermentioned period, by Order of the Department.

Quarter ended.	SWINE-FEVER.	
	Outbreaks confirmed.	Swine Slaughtered as Diseased or as having been Exposed to Infection
30th September, 1910,	14	232

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been Attacked by ANTHRAX and GLANDERS in Ireland in the undermentioned period.

Quarter ended.	ANTHRAX.		GLANDERS (including Farcy).		Epizootic Lymphangitis.	
	Outbreaks Reported.	Animals Attacked	Outbreaks Reported.	Animals Attacked.	Outbreaks Reported.	Animals Attacked.
30th Sept., 1910.	—	—	—	—	—	—

NUMBER of CASES of RABIES in DOGS in IRELAND during the undermentioned period.

Quarter ended.	Number of Cases.
30th September, 1910,	—

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been attacked by SHEEP-SCAB and PARASITIC-MANGE in Ireland in the undermentioned period.

Quarter ended.	SHEEP-SCAB.		PARASITIC-MANGE.	
	Outbreaks Reported.	Sheep Attacked.	Outbreaks Reported.	Animals Attacked.
30th Sept., 1910.	32	258	21	24

Veterinary Branch,
Department of Agriculture and Technical Instruction
for Ireland, Dublin.

ACCOUNT showing the QUANTITIES of certain kinds of AGRICULTURAL
into Ireland in each WEEK from

ARTICLES.	WEEK ENDED.				
	2nd July.	9th July.	16th July.	23rd July.	30th July.
ANIMALS LIVING—					
Horses, No.	-	-	-	-	-
FRESH MEAT—					
Beef (including refrigerated and frozen), cwt.	-	-	-	4,260	-
Mutton, " " " " "	-	-	-	1,180	-
Pork, " " " " "	-	-	-	30	-
Unenumerated, " " " "	-	-	-	-	-
SALTED OR PRESERVED MEAT—					
Bacon, cwt.	21	34	-	30	82
Beef, "	-	-	-	-	-
Hams, "	-	120	415	137	370
Pork, "	-	-	-	-	-
Meat, unenumerated, Salted cwt.	-	-	-	-	-
Meat, preserved otherwise than by salting (including tinned and canned), . . . cwt.	-	-	-	-	-
DAIRY PRODUCE AND SUBSTITUTES					
Butter, cwt.	-	-	-	-	-
Margarine, "	38	70	102	87	74
Cheese, "	-	4	-	904	3
Milk, Condensed, . . . "	44	38	87	37	32
" Cream, "	-	-	-	-	-
" Preserved, other kinds "	-	-	-	-	-
EGGS, gt. hunds	-	-	-	-	-
LARD, cwt.	-	-	20	173	-
CORN, GRAIN, MEAL AND FLOUR—					
Wheat, cwt.	282,600	169,600	300	131,900	112,100
Wheat, Meal and Flour, . . "	12,600	-	3,300	12,400	7,300
Barley, "	-	62,300	-	-	-
Oats, "	10,000	-	-	200	11,400
Peas, "	40	120	70	60	-
Beans, "	-	-	-	-	-
Maize or Indian Corn, . . "	118,400	341,200	43,100	173,700	548,000
FRUIT, RAW—					
Apples, "	-	-	-	-	-
Currants, "	-	-	-	-	-
Gooseberries, "	-	-	-	-	-
Pears, "	-	-	-	-	-
Plums, "	-	-	-	-	-
Grapes, "	-	-	-	-	-
Lemons, "	-	-	-	-	-
Oranges, "	-	-	-	-	-
Strawberries, "	-	-	-	-	-
Unenumerated "	-	-	-	-	-
HAY, tons	-	-	-	-	-
STRAW, "	-	-	-	-	-
MOSS LITTER, "	35	40	45	61	50
HOPS, cwt.	-	-	-	-	12
VEGETABLES, RAW—					
Onions, bushels,	-	-	-	-	120
Potatoes, cwt.	-	-	-	-	-
Tomatoes, "	-	-	-	-	-
Unenumerated, £	-	-	-	-	-
VEGETABLES DRIED, . . cwt.	-	-	-	-	-
Preserved by Canning, . . "	-	-	-	-	-
POULTRY AND GAME, . . £	-	-	-	-	-

* This Table is confined to the Imports of certain kinds of Agricultural Produce into a request from this Department kindly consented to separate the Irish Imports (direct) form of Weekly Returns.

PRODUCE Imported direct (i.e., from the Colonies or Foreign Countries)
2nd July to 24th September, 1910.*

WEEK ENDED							
6th Aug.	13th Aug.	20th Aug.	27th Aug.	3rd Sept.	10th Sept.	17th Sept.	24th Sept.
-	-	-	-	-	-	-	-
-	-	-	-	3,257	183	-	-
-	-	-	-	1,640	180	-	-
-	-	-	-	50	-	-	-
54	63	-	-	12	-	-	89
-	-	-	-	-	-	-	-
250	293	-	384	-	365	-	30
-	-	-	-	-	-	-	-
-	-	-	-	-	1	-	-
-	-	-	-	-	-	5	-
155	67	71	73	132	49	149	90
66	319	67	108	94	66	44	39
-	74	-	-	34	-	-	-
360	-	252	-	-	-	228	120
78	79	42	28	113	52	52	20
156,700	134,700	94,900	-	30,600	4,200	108,500	-
4,400	4,900	8,500	1,700	1,700	2,300	21,200	13,300
-	-	-	-	-	-	61,600	-
-	-	90	-	-	-	-	120
300,000	385,000	105,600	473,800	290	-	-	-
-	-	-	-	387,000	236,700	360,200	92,300
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	96	389	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
50	30	45	40	59	45	76	61
-	-	-	-	-	-	-	-
-	620	140	702	306	930	880	1,496
-	-	-	5	4	6	-	6
-	-	28	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Ireland from the Colonies and Foreign Countries. The Board of Customs have in answer from those of the United Kingdom, and to supply this Department with them in the

Statistics and Intelligence Branch,
Department of Agriculture
and Technical Instruction for Ireland.

EMIGRATION FROM IRELAND.

TABLE showing, by Destinations, the Numbers of Emigrants (Natives of Ireland) who left the Ports of Ireland during the months of July, August, and September, 1910, and the total for the Nine Months ended the 30th September, 1910, together with the total Number of Emigrants in each of the corresponding periods of the year 1909.

DESTINATION.	July. 1910.	August. 1910.	September. 1910.	Nine Months ended 30th Sept., 1910.
FOREIGN COUNTRIES :—				
America (U.S.), . . .	1,164	1,593	3,820	21,152
Canada,	438	361	438	3,944
South Africa,	19	9	35	132
Australia,	85	61	43	492
New Zealand,	3	22	35	105
Other Countries, . . .	6	5	4	76
Total,	1,715	2,051	4,375	25,901
GREAT BRITAIN :—				
England and Wales, . .	123	154	116	1,323
Scotland,	23	38	39	365
Total,	146	192	155	1,688
General Total for 1910.	1,861	2,243	4,530	27,589
General Total for 1909.	1,602	1,915	3,743	24,067

The figures are subject to revision in the Annual Report.

The figures in the above Table have been extracted from the Returns published by the Registrar-General for Ireland.

DEPARTMENT OF ~~AGRICULTURE~~
AND
TECHNICAL INSTRUCTION FOR IRELAND.

JOURNAL.

Irish Butter Industry, Proposed Legislation—Tobacco-Growing in Ireland—Field Experiments:—Barley, Hay, Potatoes, Mangels, Oats, Turnips, and Wheat—Pig Feeding Experiments—Potato Crop: Decline of the Champion—Nitrogenous Manures—Liquid Manures—Permanent Pasture Grasses—Flax Seed, Flax-Growing Experiments—Science and Art Notes—Official Documents—Notes and Memoranda—Statistical Tables.

ELEVENTH YEAR.

No. 2.

JANUARY, 1911.



DUBLIN:

PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE.
BY CAHILL & CO., LTD., 40 LOWER ORMOND QUAY

And to be purchased, either directly or through any Bookseller, from
E. PONSONBY, LTD., 116, GRAFTON-STREET, DUBLIN; or
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OLIVER AND BOYD, TWEEDDALE-COURT, EDINBURGH.

PRICE SIXPENCE.

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NOTICE.

Communications respecting the literary contents of this JOURNAL should be addressed to the Superintendent of the Statistics and Intelligence Branch, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin.

Communications respecting Advertisements should be addressed to ALEX. THOM & Co. (LIMITED), MIDDLE ABBEY-STREET, DUBLIN; or to LAUGHTON & Co. (LIMITED), 3 WELLINGTON-STREET, STRAND, LONDON, W.C., and not to the DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

THE IRISH BUTTER INDUSTRY.

PROPOSED LEGISLATION.

Address delivered by the Right Hon. T. W. RUSSELL, P.C., Vice-President of the DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND, at the Annual Dinner of the IRISH CREAMERY MANAGERS' ASSOCIATION, on 7th December, 1910.

MR. CHAIRMAN AND GENTLEMEN,

I am very glad that my engagements, which, at the present time, are neither few nor far between, enable me to be present at this the Annual Dinner of your Association. I am glad for two reasons:—First, because my presence here to-night is a guarantee that the friction, such as it was, between the Department and the Creamery Managers, is at an end. It was not originally of my making, and I am glad that a way out of the difficulties that arose has been found. In the second place, it gives me pleasure to be here because it enables me to say a few words on the butter industry and the Bill dealing with that industry, promoted by the Department, words which cannot be better or more appropriately said than before an audience of Creamery Managers who are, each and all, experts in the business. I have also to thank you for the support which your organisation has given to the Department Bill, and I desire to place before you the exact position which that measure now holds.

You will remember that when the Report of the Departmental Committee first appeared, and for months afterwards, the country was assured by those who are now opposed to the Bill that the Department contemplated control over the working of the creameries and over the butter industry generally. This misrepresentation was propagated by the opposition Press and by agents sent broadcast over the country. What the people were asked to believe virtually came to this, that an Inspector of the Department was to be present at the milking of every cow and the making-up of every parcel of butter. The idea was at once fantastic and absurd. It never had an atom of foundation. The Department never contemplated any interference with the working of the creameries or with the butter industry, apart from that which was absolutely necessary both in the interests of the industry itself, and in those of the public. We have, I think, heard the last of this form of misrepresentation. The Bill contains no such proposals.

When the publication of the first draft of the Bill made an end of this contention, a new line of opposition was immediately started. "Why legislate only against the suppliers of milk to creameries?"

it was asked. "Why should not every farmer who sold milk at his own homestead be subject to the Milkshops, Dairies and Cowsheds Order?" And the demand went up through the same Press, and by means of the same agents, that the Local Government Board Order should, by means of the Bill, be applied to milk producers all round. The Local Government Board Order, as you are aware, was issued, not in the interests of the butter industry, but in the interests of the public health. The Butter Bill of the Department, on the other hand, is a Bill dealing with the trade as a trade, and has nothing to do with public health. Everybody knows that there has been considerable friction in the country in regard to the Dairies and Cowsheds Order. But my point here is that there is no ground for applying a Public Health Order to a measure dealing with the manufacture of butter as an industry. The Department has no administrative responsibility in connection with the public health. That is one of the functions of the Local Government Board. The real reason why the inclusion of this Order in the Butter Bill was advocated with so much vehemence was, I am afraid, the certainty which some of the advocates of inclusion felt that, if included, it would at once destroy the measure, as no Bill so weighted could pass through the House of Commons.

Apparently this line of attack has also been discarded, and we are now brought to close quarters on two fresh points. In the clause defining a creamery, as you are aware, the Bill provides that before a creamery is registered the Department must be satisfied that the premises and equipment are suitable. I should have thought that a provision of this kind would have passed *nemine contradicente*. Even premises used as a public house must be suitable. The premises for a margarine factory are subject to all sorts of regulations. Every factory has to comply with rules and is subject to restrictions. But, no. The opponents of the Butter Bill come into the field again and protest that this proposal, if carried into law, would give the Department power to veto any creamery on either of the two grounds named. Now, gentlemen, a discretion in such a matter must be left somewhere. It will not do to register every shed whose owner is prepared to instal a hand separator, or even a steam separator. There must be discretion somewhere, and the discretion must in this case rest with the State authority. "Are you going," it is asked, "to leave a discretion of this kind in the hands of the Department's officials?" The discretion as to suitability of premises and equipment must, I say, be finally left to the State authority, which in this case is the Department. Mr. Campbell has publicly stated that he knows of no Irish creamery in existence at the present time which the Department would not be prepared to register if the Bill were passed. A statement of this kind publicly made on the responsibility of a high official of the Department, is treated as

of no account. "Who will succeed Mr. Campbell?" is the query next propounded. I hope the answer will not require to be given for a very long time. Gentlemen, let me say at once that I am not prepared to contend with such arguments. They are born out of deep distrust and dislike of the Department itself, and no State Department ought for one instant to listen to arguments built upon such a foundation. It may be possible, indeed, so to deal with this point that its meaning may be made clearer and more definite. What is required is not so much a definition of fitness as of unfitness. But to allow any shed to be constructed and called a creamery, to allow any farmer who owns a separator to build an outhouse, call it a creamery, and demand registration, is a thing that cannot be admitted and for which no sound or reasonable argument can be produced.

Finally, the opponents of the measure have taken their stand upon a point which, were it conceded, would go far to destroy the whole creamery industry. The Bill prohibits the reworking of butter in a creamery. It says, in effect, if Irishmen combine to form a creamery they combine to produce creamery butter. The definition of creamery butter in the Bill was assented to by almost every expert witness that was examined before the Departmental Committee. Nearly all the witnesses protested that if reworking were permitted the butter ceased to be creamery butter. "Its texture," they said, "was destroyed in the process, and otherwise the article was deteriorated by such treatment." Blending and reworking is the function of the butter factory, not of the creamery. But as to what constitutes reworking, something may still be said. The Bill provides that the cutting up and shaping of butter into rolls and small quantities is not to be construed as reworking. And, in my opinion, it is not reworking for the making of butter not finished in the morning to be resumed in the afternoon. This can, if necessary, be made clear. But what cannot be allowed—and this is a restriction in the interests of creamery butter itself, which some of these opponents of the Bill are doing their best to injure—is the reworking of butter after it has been made up and the blending therewith of other butters—a practice carried on at the present time in some creameries. This is what the Bill seeks to prohibit. Upon this there can be no compromise of any kind whatever, and it is rather a curious state of affairs to find representatives of some of the creameries contending for a liberty which is radically opposed to the true interests of the industry.

Now, gentlemen, this, so far as I understand the situation, is where we stand to-day. Every other objection has apparently been got over. I submit that the Department has acted throughout this whole matter on the most conciliatory lines. We have been accused of not taking people into consultation who ought to have been con-

sulted. What ground is there for this charge—a serious charge, if it were true? When the Departmental Committee sat, no pains were spared to secure evidence from everybody interested in the butter trade. The Irish Agricultural Organisation Society, which claims to have the superior interest in this matter, sent to give evidence the two members of its staff most competent to deal with the question—Mr. Anderson and Mr. Fant. Every branch of the industry was consulted. When the Report was produced, and before I proceeded to consider it, I publicly opened the doors of the Department in order that deputations should have an opportunity of placing views before me which might influence me in drawing the Bill. I invited criticisms of the Committee's proposals. I received, among others, representatives of your own Association. No one can say that the Department showed any unwillingness to consider the case made by this Association. As a matter of fact I adopted some of their views on the spot, and others were afterwards, on fuller consideration, included in the Bill. The Cork Butter Market Trustees asked to be, and were, received. The Irish Butter Trade Association made a similar request and were similarly welcomed. It is not true, as was stated the other day, that I refused to receive a deputation from the Irish Agricultural Organisation Society. I complied with their request to be heard on the very day that it was made, and so far was I from clinging to the Bill as it stood that I incorporated in the Bill several of the amendments suggested by the deputation which I received from that Society. In order to meet what I felt to be a good point which they made I complied with their request to include for the purposes of inspection all the homesteads of farmers engaged in the production of milk or of butter—a very large and far-reaching amendment. I have, therefore, left nothing undone in the way of conciliation. It would have been impossible for a State Department to do more in this way. We are told that a Referendum on the Bill has resulted in a vote of 96 per cent. of the Societies against it. Gentlemen, the Referendum has suddenly leaped into favour. I am wholly unmoved either by its adoption on wider political issues, or by its application to the question of butter in Ireland. But, before I accept the 96 per cent. figure, let me ask, 96 per cent. of what? There are over 700 creameries in Ireland. How many of these were asked to vote, and what did they vote upon—principle or details? This is a crucial question, and a still more crucial question is, how many of those who were asked to vote voted? We are entitled to have the complete figures even under the Referendum. I am aware myself of many co-operative creameries who consider the Bill as amended to be perfectly reasonable, and in fact advantageous to the butter industry, and who refused to vote or to have anything to do with the opposition to it. They feel that the opposition is being overdone, and that it is largely directed by personal animus.

Before I sit down let me say just this. Either a Bill of this character is required or it is not. The dissenting creameries cannot have it both ways. One would sometimes imagine from speeches and letters that the Department was hostile to the butter industry. The Department has as much interest in the success of the butter industry as any body in this country can have. It keeps a large staff, including experts whose practical knowledge can in no way be impugned, to promote its success. The idea that this State organisation would deliberately plan a Bill to injure or destroy the butter industry can only be born out of an imagination utterly perverted. See what has been done in order to conciliate and to propitiate opposition. I have said that we heard everybody entitled to be heard. Even now I am ready to hear anybody before the Bill goes finally to the Parliamentary draftsman. The usual procedure in the case of a Government measure is for the Minister concerned to hear the views of those who are interested, and on his own responsibility to decide as to the lines of the measure which he introduces into Parliament. I have adopted another method in regard to the Butter Bill. Under the Act of 1899, which created the Department, a Statutory Advisory Body was constituted, namely, the Council of Agriculture. Its sole function is to advise the Department in its work. I submitted the Bill to this important Advisory Council. The meeting at which it was considered was a most representative one, more than 80 of the 108 members who constitute it being present. The Bill was discussed clause by clause for three or four hours, and, after amendment, was adopted. This is the first time any Government Bill affecting Ireland was ever submitted to treatment of this kind. I am not afraid of the precedent, and can only hope that it may be extended. But I object to the verdict of such a body being ignored. The Bill was distributed to Committees of Agriculture, to the Press, to all the Creameries, and to a large number of public bodies. So far then from rushing a Bill or seeking to penalise an industry, I submit that the Department has gone out of its way to seek counsel and advice, and it has profited by it. But, of course, there comes a point at which a line must be drawn, and I think the point was reached when the other day it was gravely proposed that a Bill founded upon the Report of a Special Committee, and which has received all this sanction, should be withdrawn and a new Bill substituted for it, after consultation with a body claiming to represent a certain number of Irish creameries. Gentlemen, the Department may not be all that it ought to be. But it is the State authority in this matter, and a proposal of the kind I have just referred to could only be made for the distinct purpose of wrecking the Bill. The Bill is a measure honestly designed to promote the true interests of the butter industry. It does a great deal for creamery butter. It provides a definition of the article which

will enable the Department to prosecute in Great Britain, and so to clear the market of the fraudulent imitations that so gravely prejudice the sale of the genuine article. At present this cannot be done. This in itself ought to have induced every creamery in the country to stand by the measure. But the Bill does more than that. The owners of creameries have duties to the public, and it is provided that creameries also shall themselves comply with the law. The Report of the Departmental Committee declared that the sale of foreign as Irish creamery butter by Irish creameries was outside the law; and there was a strong feeling in favour of stopping this trade, within the Council of Agriculture, when the question was discussed. It is felt by many, and there is much to be said for the contention, that so long as Irish creameries can make up for the shortage in winter by selling Danish and other foreign butter winter dairying will never have much chance. The Butter Bill provides—and I think the provision will command general assent—that if this foreign butter is to be sold by Irish creameries it must be described as foreign butter and sold as such. The public must not be led to suppose that they are getting Irish butter when they are being supplied with a Danish, Siberian, or Colonial article. And I ought to say here now that should the Bill fail to pass into law this state of matters cannot be allowed to go on. The Department cannot continue to prosecute Englishmen and Scotchmen for violating the Merchandise Marks Act and allow it to be violated with impunity at our own door. In the Bill I seek to regularise the sale of this foreign butter so that the practice may go on, but within the law. I do not think that any fair minded person can say that I have sought to penalise the creameries in this matter. If I had fully adopted the recommendations of the Departmental Committee on this point some of the creameries would indeed have been in a parlous position.

That is all I wish to say in this connection, and I have again to thank you for the opportunity of making these views clear and plain. I am far from saying that the Butter Bill as it stands is perfect, or that no improvement can be made in it. Not to speak of the opportunity that will be given in Parliament for such improvements, there is abundance of opportunity now for reasonable suggestions being made to the Department. But in order that these suggestions may be considered, they must be of such a character that they do not involve the destruction of the vital principles upon which the Bill is founded. All concerned will do well to bear in mind that Danish competition grows stronger and stronger. The Danes know what they are about. At the present moment a new Butter Bill is passing through the Danish Legislature which arms the State Department there with powers of the strongest character. Under this Bill no butter made contrary to the regulations can be exported. No butter

under a certain quality can be exported. The Danish creameries are not up in arms. No. They desire to capture the British market and agree to regulations which are far stronger than anything ever proposed here. If Irish butter is to hold its own, Irish producers must fight with the same weapons as their opponents.

Again let me thank you for the support this Association has given to the Bill. I have done my best to secure two things—that it should be efficient for its purpose, and that, so far as was possible, it should be an agreed measure. And I am not without hope that these two aims will be reached.

TOBACCO GROWING IN IRELAND.

THE EXPERIMENTS IN 1910.

[*** An article dealing with the development of the tobacco-growing industry in Ireland up to the close of the year 1908 appeared in the issue of the Department's JOURNAL for January, 1909—Vol. IX., No. 2. Reprints of the article have been issued in pamphlet form, and can be obtained free of charge on application. A further article, giving additional details of the progress of the work of tobacco-growing in Ireland, appeared in the JOURNAL for January, 1910, Vol. X., No. 2. The paper below gives some account of the experiments carried out in 1910, and thus shows the latest results of the Irish tobacco-growing experiments.]

The tobacco experiments which have been conducted since 1904 under the direct supervision of the Department were carried out in 1910 by nineteen persons at nine centres situated in seven counties—Louth, Meath, King's, Kilkenny, Wexford, Tipperary and Limerick. These persons were authorised to grow upon their own lands, for experimental purposes, 99 statute acres of tobacco, which included one acre grown specially for nicotine production. In addition to this, a new scheme was started for the purpose of enabling farmers with small areas of land to experiment with tobacco-growing. This scheme encourages existing experimenters, who have the necessary experience and equipment for preparing tobacco for market, to engage and assist neighbouring small holders in the production of tobacco by instructing and financing them, and by providing them with a cash market for their tobacco as soon as it is cured. Three experimenters, situated respectively in the counties of Louth, Meath, and Limerick, availed of this opportunity to have 4½ acres grown by seven small farmers. In addition to the experimental area proper, in respect of which grants are payable by the Department to those carrying on the work, 15 acres were cropped by one experimenter, who took out an ordinary licence under the provisions of the Finance Act, 1908, permitting the general cultivation of tobacco in Ireland. Under these provisions two farmers, not identified with the Department's experiments, also obtained from the Board of Customs and Excise licences to grow tobacco.

Spring temperatures were favourable for seed beds, and the rainfall was ample for transplanting operations. The

Weather. The growing season, however, was rather too moist and cool. The excessive rains of August greatly hindered the harvesting of early cigarette and cigar varieties; it also

induced the fungus disease called Leaf Spot, which injured more or less all early tobaccos, and necessitated the harvesting of much tobacco before it was fully ripe. The air-curing of tobacco in August was greatly hindered by the wet weather, but the fine weather of September and October was particularly favourable for the curing of the later harvested tobacco. Though windstorms were not severe, they caused considerable damage in exposed situations. There was no severe frost between April and November, which is rather unusual.

Thirty-eight varieties were tried in 1910, eleven of which were grown commercially. The remaining twenty-

Varieties. seven varieties and selections of seed were merely tested upon a small scale, and comprised twelve varieties of imported seed, twelve varieties and selections of Irish-grown seed, and three Irish hybrids. None of the new imported varieties were superior to those grown commercially. In general, the Irish-grown seed compared very favourably with the imported seed, and, in the case of Blue Pryor, certain selections were greatly superior. The hybrids were of the cigarette class, and will be retained for further trial. Eleven varieties were grown commercially for the production of the various classes of tobacco with the following results:—

For Roll and Plug.—Experiments in breeding up the Blue Pryor variety to suit Irish requirements are meeting with success. A leaf of very desirable size, shape, body and colour was produced in 1910 from plants which were early and of good habit. The selections made are considered superior to Yellow Pryor or any other variety for the production of roll and plug wrapper. It should be understood, however, that only special selections of this variety are superior to Yellow Pryor for general planting.

For Brown Roll Wrappers, selected Blue Pryor, when cured rapidly with open fires, produced a leaf equal, if not superior, in colour and finish to Burley. As the Burley varieties are not so easily grown and cured in this climate, and as the lower grades are more difficult to sell, selected Blue Pryor is recommended as a superior variety.

For Bright Pipe Cutters, no tobacco was specially grown in 1910, as other classes offered greater opportunities for profit.

Cigarette Tobaccos of four types were produced from Turkish, Pryor and Hybrid varieties. Several new Turkish varieties were tried, but Yacca varieties have again shown their superiority. Of Pryor varieties, a specially selected chlorotic plant has given indications of quality, and will be cultivated more extensively in 1911 for the production of the Virginia type of cigarette tobacco. Other varieties, including Yellow Orinoco, have again proved unreliable for this purpose. Burley varieties for cigarettes have been finally discarded

owing to their peculiar flavour. The Samos variety has again shown itself particularly suitable for the production of a handsome bright leaf, offering the best promise of any Irish cigarette tobacco that has yet been produced.

For Cigar Wrappers, the Sumatra variety was again most satisfactory, though Halliday, a new Connecticut variety, is promising.

Of all the types and classes grown in 1910, Yellow Pryor and Selected Irish Blue Pryor for pipe smoking have given the most satisfactory results from all standpoints.

The importance of shelter for all varieties of tobacco is clearly emphasised every year, but on several occasions, especially during 1910, it was clearly shown that excessive shelter may injuriously affect all but cigar wrapper varieties, by shading the plants and by stagnating the atmosphere, which retards evaporation, and thus causes the leaves to remain soft and succulent.

Excellent results were again obtained on friable soils which have grown tobacco continuously, but, in the case of very heavy soils, the addition of vegetable fibre due to rotation proved of great advantage. Insect pests were very troublesome, however, on very old sod, even after an oat crop. For this reason, heavy lands long in grass should produce two crops of oats before being planted with tobacco.

Defective drainage and bad subsoil had a decided effect on the quality of tobacco owing to the wet season. One field of bog land produced a very inferior crop, due to the saturated condition of the soil. When the drainage was poor, the tobacco made almost no growth, but even in the best drained parts of the field the land remained cold and sodden until it was too late for the tobacco to mature. Well-drained moor and moory clay produced good crops.

Rye was again sown as a winter cover crop and for green manure. Though the winter of 1909-10 was very severe and the spring backward, the rye proved valuable where it had been sown in October immediately after the previous year's tobacco was harvested. Late sowing is futile, as the rye has to be ploughed under not later than 15th April. Land sown early with rye seems to produce fewer weeds during the following season, and the manurial value of rye is considerable.

Land prepared when too wet produced a crop of tobacco very inferior to that on adjacent land which received proper treatment.

Manurial experiments were carried out at five centres in order to determine the best methods and quantities for application. The results will appear in a leaflet on the subject.

It was again demonstrated that, under proper conditions, seedlings may be grown in tight, glass-covered, cold frames.

Seed Beds. In the case of several new growers, it was evident that the average farmer must learn by experience how to handle hotbeds.

The absence of frost in May, and the frequent rains made planting easily accomplished without delay or recourse to watering. Planting was never completed as early as in 1910. It was shown that plants set in very wet soil will not do so well in this climate as when the soil is somewhat drier.

The continuous rains of August made it impossible to clear the soil of weeds before the growth of the tobacco prevented further cultivation. Chickweed was, therefore, seeding abundantly when the tobacco was harvested. In one case many of these seeds were germinated by the harrowing and by the ploughing in preparation for a rye crop, a growth of weeds appearing after each of these operations, and also after the rye had been sown.

With heavy pipe varieties, it is difficult to get most growers to top sufficiently low so as to produce the desired thickness and spread in the leaves.

Topping and Suckering.

The ripening season for early tobacco was exceedingly unfavourable. Continuous rains washed the gum off the leaves as fast as the cool weather permitted it to form. Much early tobacco had to be harvested before it was fully matured, in order to save it from disease.

Ripening

and

Harvesting.

The dry September weather was, however, quite favourable for the ripening of late varieties. Attempts to devise a machine for stringing primed leaves proved unavailing. Hanging the plants on scaffolds to wilt was more extensively practised, and resulted in a great saving of barn space.

An important advance in methods of curing was marked by the use of portable sheds for wilting and partly curing the tobacco in the field. The arrangement consists of a set of straight timbers, which can be quickly adjusted to form a substantial framework. This is roofed with a tarpaulin, and in this form makes an excellent covered scaffold on which tobacco may hang for a fortnight without attention. If desired, it may be walled with cheap jute canvas, and open wood fires may be used for completing the curing in the case of heavy pipe tobaccos.

Curing.

Notwithstanding the difficulties of saving tobacco seed in Ireland, results indicate that it is the proper thing to do.

Seed Saving. Improved methods of saving seed are, therefore, being devised and tested.

Slugs, wireworms, and leather jacket larvæ were troublesome as usual in lands recently in old grass. Frequent

Insects and Diseases. harrowing in dry weather before planting was rather effective in killing slugs. The wet weather during the latter half of August was particularly favourable to the development of leaf spot fungus, for which there is no remedy but clean cultivation and prompt harvesting.

The canvas barns before mentioned, capable of holding the tobacco grown upon one acre, can be had complete for about

Curing Barns. £8. They can be supplied with a felt roof, instead of a tarpaulin cover, for £7 extra. A very simple curing barn to hold the produce of one acre was constructed this year for £30, which is about the minimum for a permanent structure.

A large part of the crop of 1909 was packed in bales instead of hogs-

Grading, Ordering and Packing. heads, with satisfactory results to both the grower and manufacturer.

Everything points to the fact that Irish tobacco would benefit by greater attention being paid to the maturing, which

Maturing. is a process liable to be neglected by the grower. To test this, small portions of the crop of 1908 are still retained by the growers.

The practice of selling direct to the manufacturer still continues, and the 1909 crop was sold to three manufacturers,

Marketing. two in Dublin and one in London, who bought the crop of 1908.

Most of the tobacco grown in 1909 was bought by means of growers' samples and official samples withdrawn

Prices. from bond. In most cases prices were placed upon each package, which is the proper method of sale.

The prices obtained represent the fair value of the tobacco.

TABLE I.

The Number of Experimenters and the Acreage, Yield and Prices of the Tobacco grown in each of the Years from 1904 to 1909 inclusive were as follows:—

Year.	No. of Growers	Total Acreage	Total Yield.	Yield per Acre.			Average selling Price per lb.	Range of Prices per lb.
				Average.	Maximum	Minimum		
			lbs.	lbs.	lbs.	lbs.		
1904	1	20	7,984	400	—	—	5d.	4½d. to 6d.
1905	15	34	27,566	811	1,507	176	4½d.	2½d. to 9d.
1906	18	77½	66,714	861	1,661	277	4½d.	2½d. to 8½d.
1907	21	93	*55,194	634	2,299	274	4½d.	3d. to 9d.
1908	21	101	121,191	1,200	1,971	808	5½d.	2d. to 2/6.
1909	20	130½	118,798	910	1,307	644	†5½d.	1d. to 1/3.

*Produce of 6 acres not included, as almost the entire crop, estimated at 10,400 lbs., was accidentally destroyed by fire.

† The average in this column is calculated on the quantity sold, viz., 88,643 lbs., the amount unsold, 30,155 lbs., not being taken into account. The unsold tobacco has been estimated to range in value from 7-3d. to 8d. per lb.

TABLE II.

The following Table shows for each Class and Type of Tobacco grown commercially in the Year 1909, the Yield per Acre, the Cost of Production per lb. and per acre, and the Amount received for the Tobacco per lb. and per acre:—

Class.	Pipe.	Cigarette.		Cigar.	Mixed.	
Type.	Prior. Average of 4 Centres.	Samos and Samos Hybrids. Average of two centres.	Turkish. One Centre.	Mixed. One Centre.	Sumatra. One Centre.	Pipe Cigarette and Cigar. One Centre.
Yield per acre (lbs.),	818	1,287	578	1,103	812	1,013
Cost of production, per lb.	8-3d.	8-5d.	19-1d.	14-5d.	19-3d.	8d.
Amount received, per lb.	5d.	6d.	7-3d.	7-6d.	5-2d.	6-8d.
Cost of production, per acre.	£ s. d. 29 5 10	£ s. d. 45 13 2	£ s. d. 46 2 8	£ s. d. 66 13 9	£ s. d. 65 6 6	£ s. d. 33 17 1
Amount received per acre.	17 13 10	31 15 6	17 13 11	34 18 2	17 11 6	28 12 10

The following figures (Table III.), giving the acreage, types, yields, cost and selling prices, &c., refer to the 1909 crop. The returns for the crop of 1910 are not yet available.

TABLE

Showing in detail the Receipts and Expenses per statute

Class.	Pipe.			
Type.	Pryor.			
Centre.	Athlumney, Co. Meath.	Mullagh and Mullacrew, King's.	Smarmore, Co. Louth.	†Tagoat, Co. Wexford.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Seedbeds,	1 12 11	1 3 2	4 8 9	0 12 0
Farmyard Manure for fields.	0 8 0	—	5 0 0	2 14 0
Spreading manure,	—	—	2 10 0	0 15 10
Preparation of land,	0 16 4	1 5 6	3 1 8	1 9 9
Shelter belts,	—	—	—	0 5 1
Artificial manure,	5 0 0	5 1 9	3 6 7	2 12 3
Planting,	0 16 11	0 12 8	0 6 4	0 16 3
Cultivation,	1 11 7	1 11 7	1 9 0	1 3 5
Suckering and Topping,	0 11 0	1 9 7	1 0 8	0 12 10
Harvesting,	2 14 11	1 0 1	3 5 0	2 15 3
Curing,	0 19 9	2 7 0	2 16 1	3 3 5
Fermenting,	—	—	—	—*
Grading,	2 6 9	1 15 11	2 3 4	2 6 11
Packing,	0 19 11	1 8 11	1 3 4	1 2 7
Maturing,	0 4 2	0 7 6	0 2 8	0 17 3
Marketing,	0 10 8	0 9 5	0 9 6	0 17 9
Rent and Taxes,	2 1 11	1 1 7	2 3 0	1 8 9
*Interest—Depreciation (Estimated).	3 10 0	3 10 0	3 10 0	3 10 0
†Miscellaneous Expenses.	—	—	—	0 18 3
1. Total Expenses,	24 4 10	23 4 8	36 15 11	28 1 7
2. Receipts for Tobacco,	20 9 7	19 9 6	14 17 11	17 14 9
3. Yield of cured to- bacco (lbs.).	878	888	725	850
4. Average cost of pro- duction, per lb.	6·6d.	6·3d.	12·2d.	7·9d.
5. Selling price, per lb.,	5·6d.	5·3d.	5·0d.	5·0d.
6. Area under experi- ment (acres).	10	14	22	13½

* This item relates to the curing equipment only, and is calculated on a 10 which is taken as 3s. per day, exclusive of driver. Owing to the experimental have been provided at most centres, but the experiments having proved that the instructive to charge Interest and Depreciation upon the cheapest equipment present stage. The total costs of production as set forth in the table are likewise growers.

† These expenses, which include salary paid to Secretary of Co-operative Society Centre, being co-operative and including a number of growers.

‡ In the case of Wexford, the tobacco was produced by 12 different growers society for the curing and disposal of the crops. Each grower is charged with a weight of his crop. For details of the results in the case of each grower, see

§ Less than one-third of the tobacco produced at this centre proved suitable which it was poorly adapted and, as a result, the price received for it was below

|| Pipe tobacco was grown on 10½ acres, Cigarette tobacco on 8½ acres, and

III.

acre in respect of Tobacco grown at each centre in 1909.

Cigarette.				Cigar.	Mixed.
Samos and Samos Hybrids		Turkish.	Mixed.	Sumatra.	Pipe, Cigar, and Cigarette.
Kilkenny.	Tullamore.	Kilcurley, Co. Limerick.	Adare, Co. Limerick.	Cordangan, Co. Tipperary.	Randlestown Co. Meath.
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
3 2 6	0 17 6	3 19 4	5 16 3	5 11 1	2 3 8
4 3 4	1 5 0	—	0 10 6	} 5 0 0	0 8 0
0 18 3	0 10 3	—	0 7 5		0 4 8
1 0 5	0 10 3	1 5 0	2 11 6	1 19 0	2 2 7
0 5 4	—	—	—	4 4 2	—
1 12 8	1 16 0	—	2 16 9	4 1 1	3 18 9
1 5 10	1 5 3	4 9 5	5 16 0	3 13 6	1 14 5
1 1 3	1 14 2	2 13 3	4 0 2	3 9 10	1 0 11
1 15 5	1 7 6	—	1 1 2	1 9 3	0 17 1
10 18 1	4 14 3	14 0 2	17 16 3	11 17 4	6 2 6
5 11 7	9 1 1	6 2 1	7 9 6	3 18 5	4 6 5
—	—	—	—	2 11 3	0 7 6
—	1 10 2	6 9 2	7 10 8	5 6 8	1 17 1
5 6 1	1 10 2	1 11 4	2 0 3	1 2 1	0 19 6
0 14 7	1 17 8	1 2 1	1 2 1	1 0 8	0 12 3
0 15 7	1 12 4	0 4 9	0 9 2	0 8 6	0 1 8
1 16 8	3 10 0	1 6 1	1 6 1	3 13 8	1 0 1
6 0 0	6 0 0	3 0 0	6 0 0	6 0 0	6 0 0
46 7 7	39 1 7	46 2 8	66 13 9	65 6 6	33 17 1
32 13 8	23 12 0	17 13 11	34 18 2	\$17 11 6	28 12 10
1,307	1,106	578	1,103	812	1,013
8-5d.	8-5d.	19-1d.	14-5d.	19-3d.	8-0d.
6-0d.	5-0d.	7-3d.	7-6d.	5-2d.	6-8d.
9	1	10	20	10	21½

per cent. basis. The charge for implements is included with that for horse labour nature of Tobacco-growing in Ireland, elaborate and expensive curing barns crops can be handled with less expensive equipment, it is considered more which would be required by a person beginning the production of tobacco at the influenced by the experimental nature of the crop, and by the inexperience of the

and auditing and printing charges are due to the system of growing at the Wexford.

in the neighbourhood of Tagoat. These growers have formed a co-operative part of the cost of curing and all subsequent operations proportionate to the Table IV.

for cigar purposes. The balance of the crop had to be sold as pipe tobacco for that obtained for tobacco grown expressly for pipe smoking.

Cigar tobacco on 2½ acres, at this centre.

TABLE

Showing in detail the RECEIPTS and EXPENSES per acre
CO-OPERATIVE TOBACCO GROWERS' SOCIETY, at

Class.	Pipe.				
Type.	Pryor.				
Co. Wexford. Name of Grower.	P. Byrne.	N. Codd.	Ed. Doyle.	M. Doyle.	J. Eyre.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Seedbeds,	0 16 0	0 8 10	0 13 2	0 14 8	1 3 2
Farmyard Manure for fields, .	1 5 0	4 0 8	4 8 0	3 15 0	2 18 11
Spreading manure,	0 12 6	0 15 5	1 5 7	0 17 1	0 12 3
Preparation of land,	1 15 0	0 17 11	0 16 9	1 5 6	1 0 4
Shelter belts,	0 13 0	0 9 7	0 10 0	—	—
Artificial Manure,	1 12 0	2 16 5	2 0 0	3 10 0	2 19 4
Planting,	0 6 0	1 0 11	0 7 6	1 17 0	1 9 6
Cultivation,	0 15 0	0 16 1	0 18 3	1 13 1	1 16 4
Suckering and Topping,	0 11 3	0 4 0	0 5 8	0 14 7	1 1 5
Harvesting,	1 15 0	1 17 11	1 15 4	5 2 4	4 19 8
Curing,	8 8 6	8 19 7	9 13 4	8 2 3	11 5 11
Fermenting,					
Grading,					
Packing,					
Maturing,	1 5 4	1 1 11	1 13 10	1 6 10	2 6 0
Marketing,					
Rent and Taxes and Insurance	3 10 0	3 10 0	3 10 0	3 10 0	3 10 0
Interest—Depreciation (Estimated).	0 18 3	0 18 3	0 18 3	0 18 3	0 18 3
Miscellaneous Expenses,	24 2 10	27 17 6	28 15 8	33 6 7	36 1 1
1. Total Expenses,	18 0 1	15 3 1	16 13 6	16 10 4	23 0 6
2. Receipts for tobacco,	853	733	782	821	1,020
3. Yield of cured tobacco (lbs.).	6·8d.	9·1d.	8·8d.	9·7d.	8·5d.
4. Average cost of production, per lb.	5d.	5d.	5·1d.	4·8d.	5·4d.
5. Selling price, per lb.,					

IV

of TOBACCO grown by each member of the WEXFORD
Togoat, Co. Wexford, in the Year 1909.

Pipe.

Pryor.

J. Harpur.	N. Hayes.	F. B. Jacob.	Mrs. Keating.	N. Murphy.	T. Pettit.	B. H. Roice.
£ s. d. 0 10 4 2 7 2 0 4 1 0 8 9 0 6 7 3 2 9 0 4 8 0 16 6 0 7 1 0 11 7 6 15 0 1 5 11 3 10 0 0 18 3 21 8 8 12 13 5 644 8d. 4·7d.	£ s. d. 0 4 4 2 3 5 1 1 9 2 3 5 — 1 9 6 1 14 9 1 4 4 0 17 4 3 9 6 8 16 3 1 8 7 3 10 0 0 18 3 29 1 5 15 16 3 775 9d. 4·9d.	£ s. d. 0 4 4 0 17 4 0 5 2 1 3 10 — 2 17 1 0 14 11 1 15 10 1 1 6 3 19 6 8 16 5 1 14 3 3 10 0 0 18 3 27 18 5 16 5 5 769 8·7d. 5·1d.	£ s. d. 1 0 0 3 6 8 0 8 6 2 16 4 0 1 9 3 3 4 1 10 9 0 9 9 0 9 9 2 7 7 11 0 2 1 3 5 3 10 0 0 18 3 31 6 3 22 0 6 1,061 7·1d. 5d.	£ s. d. 0 13 6 3 5 0 0 16 10 2 10 0 0 16 10 1 14 0 0 9 4 1 9 4 0 16 0 3 12 10 8 2 5 1 8 2 3 10 0 0 18 3 30 2 6 16 16 9 822 8·8d. 4·9d.	£ s. d. 0 6 9 2 7 9 1 15 4 1 12 5 0 1 9 2 19 0 0 10 5 0 15 5 0 10 5 1 19 10 9 6 4 1 3 6 3 10 0 0 18 3 27 17 2 17 13 5 834 8d. 5·1d.	£ s. d. 0 9 4 1 5 7 0 12 10 1 9 11 0 4 3 2 19 10 0 8 6 1 9 11 0 15 4 1 14 2 11 19 6 1 8 0 3 10 0 0 18 3 29 5 5 21 15 10 1,036 6·8d. 5d.

FIELD EXPERIMENTS—1910.

I.—BARLEY.

The experiments in barley cultivation conducted during the past season were a repetition of those carried out since 1908, the object of which was to ascertain the relative values of a single ear culture of Irish Archer and Danish Archer, and also as to what extent, if any, the latter variety deteriorates in yielding capacity and quality by cultivation in Ireland.

The experiments in 1910 were conducted at one centre in each of the following counties—Cork, Wexford, Louth, Carlow, Kildare, and Kilkenny.

The results of the experiments carried out in 1901-1906, inclusive, indicate that Archer is a much more remunerative barley for general cultivation than any of the other barleys tested. The only variety approaching Archer in return per acre was Goldthorpe, but in fifty-one tests carried out in the six years, the average value per acre of this barley was 12s. per statute acre *less* than that of Archer.

Previous to 1906, inquiry in Denmark had revealed the fact that a barley called Prentice, originally imported from England, and apparently identical with Archer, had been subjected to exhaustive comparisons with Goldthorpe and other varieties, and found to give the best yield. Large bulks of this variety had been obtained in Denmark by yearly increasing the quantities produced as a result of the cultivation of the grains of a single ear. It was therefore decided to compare Prentice barley with the existing strain of Irish Archer in 1906. The result of that year's experiments was that Prentice came out decidedly the better yielder, with a money value of 11s. 6d. per statute acre in excess of Irish Archer, which was 9s. 5d. per statute acre better than Goldthorpe. Two causes for the superiority of Prentice may be suggested:—

- (a.) The effect of change of climate from Denmark to Ireland.
- (b.) The process of selection to which the barley had been subjected in Denmark.

The scheme of experiments of 1907 was formulated with the idea of, firstly, obtaining additional information regarding the relative values of Irish Archer and Prentice; secondly, of arriving at some conclusion as to the extent of deterioration, if any, of the Danish seed grown in Ireland one year, and, thirdly, the value of English Archer as compared with the other two strains.

As Prentice barley is botanically identical with Archer, for the purposes of this report it is called *Danish Archer*.

The seed of Irish Archer was portion of the bulk of produce of hand-selected Archer seed of 1904, the Danish Archer grown in Ireland one year was obtained from one of the Experimental Plots of 1906, English Archer from Essex, and Danish Archer from Denmark.

The results of these experiments showed that the Danish Archer freshly imported and the same variety grown in Ireland one year were practically equal in value, and that they were respectively $5\frac{1}{2}$ and $4\frac{1}{2}$ stones per statute acre more prolific than Irish Archer, while English Archer fell $9\frac{1}{2}$ stones per acre below the latter in yield, and was of less value by 10s. 2d. per acre.

In extenuation of this variety, however, it must be said that the seed was obtained from a commercial source, and was found to be badly mixed. This fact may, to some extent, account for its lower productivity and somewhat inferior quality.

The outstanding result of the 1907 experiments was that the relative value of Irish Archer as compared with Danish Archer was improved by 7 stones per acre. It must, however, be borne in mind that apart from the effects of any climatic influences the two lots of seeds are not comparable in their origin or method of propagation, for whereas the Danish Archer is the produce of a single selected ear, the Irish Archer was raised from a large number of ears selected by hand. If the first method of selection has anything in its favour, truly comparable results can only be obtained by testing bulks of seed raised by identical methods.

With this point in view the scheme of experiments in 1908 was drawn up to test Irish Archer seed grown originally from a single ear with Danish Archer freshly imported and Danish Archer grown in Ireland two years.

As there was also sufficient seed of single ear production of two varieties of Goldthorpe these barleys were included in the scheme of experiments.

A comparison of the results obtained in 1908 shows that the returns from Danish Archer seed grown in Ireland two years and Danish Archer seed freshly imported were practically equal, while Irish Archer further enhanced its relative productivity, and was, on the average, only inferior to these lots of barley by one and two and a half stones per statute acre respectively. Irish Archer returned a high percentage of screenings, owing to the plot of one centre becoming badly laid, and in total value per statute acre, *i.e.*, the value of good corn plus the value of screenings, it has produced a slightly higher monetary return than either of its Archer competitors.

The experiments in 1909 were conducted to further test the value of Irish Archer and two Danish Archers—the seed of the first of which two lots was the produce of barley originally imported into Ireland from Denmark in 1906, and of the second freshly imported

from Denmark. Goldthorpe was also included at all centres, and Carter's Goldthorpe R.R. at four centres.

The results obtained, in so far as the Archers were concerned, clearly substantiated the figures obtained in 1908.

Both Goldthorpes fell considerably below the Archers in yield per acre, but the quality was, on the average, better than that of the other three barleys tested. Of the two types, the ordinary Goldthorpe appeared to be slightly superior in yielding capacity to Carter's Goldthorpe R.R.

The experiments conducted during the past season were confined to a further test of Irish Archer, Danish Archer grown in Ireland for *four years*, and the same variety freshly imported. Each plot was one statute acre in extent, and, in order to obviate the results of variations in the soil, which unfortunately do occur to a striking extent, the plots were duplicated at all centres.

CHARACTER OF SEASON, 1910.

The season of 1910 was very marked in its contrast to that of 1909.

January and February were cold wintry months with heavy rain and snow showers. The early days of March were incessantly wet, and there were floods in many places. Drier conditions prevailed from the middle until the end of the month, accompanied with warm, sunny weather. During this period most of the barley was sown, the land being then in what may be called fair condition. April, on the whole, was a month of low temperatures, cold winds, and heavy rain showers.

Corn crops made very slow progress, and were in a backward condition at the beginning of May, which month, until about the 15th instant, resembled April in its severity, but after this date more genial conditions prevailed.

The early portion of June was warm and sunny. There were heavy rains from the third week until the end of the month—a period characterised by low temperatures and lack of sunshine.

The first half of July was hot, with plenty of sunshine, but these conditions were unfortunately followed by a period of cold, dull, windy weather, with torrential downpours of rain at times. Heat and sunshine were greatly needed at the end of this month to complete the filling of the grain, which up to this time had developed extraordinarily well considering the generally unfavourable conditions to which the crop had been subjected.

August may be characterised as a wet and windy month, with low temperature and great deficiency of sunshine. Harvesting operations were greatly delayed, and early corn, as a consequence, suffered considerably.

There was a more settled period of weather for the first fortnight

of September, and harvesting proceeded rapidly. Some warm sunny days during this period greatly improved the condition of barley.

Owing to the unsettled weather immediately after harvesting, threshing was prolonged more than usual, and the condition of barley when purchased was only fair. The grain, as a rule, was thin, but it will probably produce better malt than its appearance indicates. The yield per acre was considerably less than that of 1909.

TABLE SHOWING THE YIELD AND VALUES

Farm.	Date sown.	Date reaped.	Irish Archer.					
			Yield per Statute Acre.	Value.				
				Per Brl.	Per Acre.			
1. (a) R. Hawkins, Whitegate, Co. Cork.	March 18th.	Aug. 25th.	Bls. Sts. 11 8	s. d. 14 9	£ s. d. 8 9 8			
Screenings, . . .			0 4	10 0	0 2 6			
Total, . . .			11 12		8 12 2			
(b) Screenings, . . .	"	"	12 4	14 9	9 0 8			
			0 4	10 0	0 2 6			
Total, . . .			12 8		9 3 2			
2. (a) W. B. Nunn, Castle Bridge, Wexford.	April 5th.	Aug. 24th.	9 4	15 6	7 3 5			
Screenings, . . .			0 11	10 0	0 6 10			
Total, . . .			9 15		7 10 3			
(b) Screenings, . . .	"	"	9 1	15 6	7 0 6			
			1 3	10 0	0 11 10			
Total, . . .			10 4		7 12 4			
3. (a) J. Kearney, Carlingford, Co. Louth.	March 28th.	Sept. 6th.	8 8	15 0	6 7 6			
Screenings, . . .			0 4	10 0	0 2 6			
Total, . . .			8 12		6 10 0			
(b) Screenings, . . .	"	"	8 7	15 0	6 6 7			
			0 5	10 0	0 3 1			
Total, . . .			8 12		6 9 8			
4. (a) Brown & Crosthwait, Bagenalstown, Co. Carlow.	March 31st.	Aug. 27th.	13 1	14 6	9 9 5			
Screenings, . . .			0 13	10 0	0 8 1			
Total, . . .			13 14		9 17 6			
(b) Screenings, . . .	"	"	13 6	14 6	9 13 11			
			0 14	10 0	0 8 9			
Total, . . .			14 4		10 2 8			

FOR THE EXPERIMENTAL PLOTS, 1910.

Danish Archer, ex Ireland 1906, 1907, 1908 and 1909.										Danish Archer, ex Denmark 1910.									
Date reaped.	Yield per Statute Acre.		Value.						Date reaped.	Yield per Statute Acre.		Value.							
			Per Brl.			Per Acre.						Per Brl.			Per Acre.				
Aug. 25th.	Bls.	Sts.	s.	d.	£	s.	d.	Aug. 25th.	Bls.	Sts.	s.	d.	£	s.	d.				
	13	1	14	9	9	12	8		12	6	15	0	9	5	8				
	0	4	10	0	0	2	6		0	4	10	0	0	2	6				
"	13	5			9	15	2	"	12	10			9	8	2				
	12	8	14	6	9	1	3		12	2	14	9	8	18	10				
	0	4	10	0	0	2	6		0	4	10	0	0	2	6				
Aug. 24th.	12	12			9	3	9	Aug. 24th.	12	6			9	1	4				
	9	8	15	6	7	7	3		9	1	15	6	7	0	6				
	0	12	10	0	0	7	6		0	10	10	0	0	6	3				
"	10	4			7	14	9	"	9	11			7	6	9				
	9	11	15	6	7	10	2		10	5	15	6	7	19	10				
	0	14	10	0	0	8	9		0	13	10	0	0	8	1				
Sept. 6th.	10	9			7	18	11	Sept. 6th.	11	12			8	7	11				
	8	12	14	9	6	9	1		8	12	15	0	6	11	3				
	0	5	10	0	0	3	1		0	5	10	0	0	3	1				
"	9	2			6	12	2	"	9	1			6	14	4				
	8	2	14	9	5	19	10		8	8	15	0	6	7	6				
	0	6	10	0	0	3	9		0	5	10	0	0	3	1				
Aug. 28th.	8	8			6	3	7	Aug. 28th.	8	13			6	10	7				
	13	12	14	6	9	19	5		13	13	14	9	10	3	9				
	0	13	10	0	0	8	1		0	8	10	0	0	5	0				
"	14	9			10	7	6	"	14	6			10	8	9				
	13	2	14	9	9	13	7		13	3	14	6	9	11	3				
	1	0	10	0	0	10	0		0	12	10	0	0	7	6				
Aug. 28th.	14	2			10	3	7	Aug. 28th.	13	15			9	18	9				

TABLE SHOWING THE YIELD AND VALUES

Farm.	Date sown.	Date reaped.	Irish Archer.						
			Yield per Statute Acre.	Value.		Per Brl.	Per Acre.		
5. (a) M. J. Minch, Athy, Co. Kildare. Screenings, . . . Total, . . . (b) Screenings, . . . Total, . . .	March 18th.	Sept. 1st.	Bls. Stns.	s.	d.	£	s.	d.	
			10 2	15 0	7 11 11				
			0 10	10 0	0 6 3				
				10 12			7 18 2		
				10 13	15 0	8 2 2			
				0 8	10 0	0 5 0			
				11 5		8 7 2			
	6. (a) J. Murphy, Danesfort, Kilkenny. Screenings, . . . Total, . . . (b) Screenings, . . . Total, . . . Average Yield and Value of good corn. Screenings, . . . Average Total Yield and Value.	March 24th.	Sept. 1st.	7 10	15 0	5 14 5			
				0 12	10 0	0 7 6			
				8 6		6 1 11			
				9 5	15 0	6 19 8			
				0 5	10 0	0 3 1			
				9 10		7 2 9			
				10 4		7 13 4			
				0 9		0 5 8			
				10 13		7 19 0			

NOTE I.—All samples have been
NOTE II.—The screenings have been

FOR THE EXPERIMENTAL PLOTS, 1910.

Danish Archer, ex Ireland 1906, 1907, 1908 and 1909.					Danish Archer, ex Denmark 1910.				
Date reaped.	Yield per Statute Acre.		Value.		Date reaped.	Yield per Statute Acre.		Value.	
			Per Brl.	Per Acre.				Per Brl.	Per Acre.
Sept. 1st.	Bls.	Stns.	s.	d.	£	s.	d.		
	10	5	15	0	7	14	8		
	0	8	10	0	0	5	0		
"	10	13			7	19	8		
	9	13	15	0	7	7	2		
	0	9	10	0	0	5	7		
"	10	6			7	12	9		
	7	14	15	0	5	18	2		
	0	7	10	0	0	4	4		
"	8	5			6	2	6		
	8	10	15	3	6	11	6		
	0	8	10	0	0	5	0		
"	9	2			6	16	6		
	10	7			7	15	5		
	0	9			0	5	8		
"	11	0			8	1	1		
	7	12	15	0	5	16	3		
	0	5	10	0	0	3	1		
"	8	1			5	19	4		
	8	3	15	0	6	2	10		
	0	10	10	0	0	6	3		
"	8	13			6	9	1		
	10	5			7	14	4		
	0	8			0	5	0		
"	10	13			7	19	4		

valued as delivered in Dublin.
valued throughout at 10s. per barrel.

The following Table shows at each centre the name of the experimenter, the character of the soil and subsoil, and its previous treatment:—

Centre.	Experimenter.	Character of Soil and Subsoil.	Previous Treatment of Land.
1. Whitegate, Co. Cork.	R. Hawkins, Whitegate.	Good brownstone loam. Subsoil—gravel and shale. Geol. form.—Brownstone or old Red Sandstone.	1908, Hay. 1909, Roots, with farmyard manure and artificials.
2. Castle Bridge, Co. Wexford.	W. B. Nunn, Castle Bridge.	Sandy loam. Subsoil, sand. Geol. form.—Cambrian.	1908, Barley. 1909, Roots, with farmyard manure.
3. Carlingford, Co. Louth.	J. Kearney, Wilville.	Good drift loam. Subsoil, gravel and yellow clay. Geol. form.—Carboniferous limestone.	1908, Barley. 1909, Roots, with farmyard manure.
4. Bagenalstown, Co. Carlow.	Brown & Crosthwait. Bagenalstown.	Light Loam. Subsoil, limestone gravel. Geol. form.—Carboniferous limestone.	1908, Oats. 1909, Roots, with farmyard manure.
5. Athy, Co. Kildare.	M. J. Minch, Rockfield.	Good limestone loam. Subsoil, limestone gravel. Geol. form.—Carboniferous limestone.	1908, Barley. 1909, Roots, with farmyard manure.
6. Kilkenny, Co. Kilkenny.	J. Murphy, Danesfort.	Strong loam. Subsoil, gravel and yellow clay. Geol. form.—Carboniferous limestone.	1908, Oats. 1909, Potatoes.

COMPARISON OF THE THREE BARLEYS TESTED AT ALL CENTRES.

The average yield and money value per statute acre of Irish Archer, Danish Archer (grown in Ireland four years), and Danish Archer (freshly imported), are shown in the following table:—

Variety.	Average yield of good corn per Statute Acre.		Average value of good corn per Statute Acre.		Per-centage of Screen-ings.	Average total value with Screenings.	
	Brls.	Stns.	£	s.	d.	%	£ s. d.
Irish Archer,	10	4	7	13	4	5.2	7 19 0
Danish Archer, ex Ireland 1906, 1907, 1908, and 1909.	10	7	7	15	5	5.0	8 1 1
Danish Archer, ex Denmark, 1910	10	5	7	14	4	4.6	7 19 4

It will be seen that, as in former years, there is very little difference in the yield and value of the Irish Archer as compared with the Danish Archers.

Between the Danish Archer *freshly imported* and the same variety grown in Ireland for *four years* no significant difference either in yield or quality has been established.

A further comparison of the three lots of Archer is made in the following table, which shows their relative yields and values for the years 1908, 1909 and 1910:—

Variety.	Average yield of Good Corn per Statute Acre.			Percentage of Screenings.			Average Total Value per Statute Acre, i.e., value of Good Corn and Screenings.			
	1908.	1909.	1910.	1908	1909	1910	1908.	1909.	1910.	Average for three years, 1908, 1909 and 1910.
	Brls.	Stns.	Brls.	Stns.	Brls.	Stns.	%	%	%	£ s. d.
Irish Archer,	11	1½	14	0	10	4	7.3	3.7	5.2	9 7 6 11 0 1 7 19 0 9 8 10
Danish Archer, ex Denmark, 1906.	11	2½	14	1	10	7	4.4	4.1	5.0	9 3 9 11 1 6 8 1 1 9 8 9
Danish Archer, freshly imported from Denmark.	11	4	14	3	10	5	4.9	3.8	4.6	9 6 10 11 3 8 7 19 4 9 9 11

GENERAL REMARKS.

I. *Purity of Seed*.—During the past three seasons a remarkable improvement has been effected in the general quality of the barley raised on the Experimental Plots by a proper selection of the seed that has been used. The selections were commenced in 1905 from single ears, and there was a sufficient quantity of produce in 1908 to sow the whole of the Experimental Barley Plots of that year. The evenness and general improvement in the appearance of the resulting crops have been most marked, while in addition, the relative productivity of the varieties has been increased, in one case by as much as 12 stones per statute acre. These considerations emphasise not only the desirability of obtaining *pure seed*, but also its necessity, if the grower wishes to obtain the maximum yield and quality from the varieties he sows. As varieties of barley ripen in widely different periods, it is impossible to obtain an even sample, and a maximum yield, from a *mixed* sample of seed.

II. *Manuring*.—Under the system of rotation of crops in this country barley is usually sown after a root crop grown with the aid of farmyard, and, in many cases, artificial manure, and the residuum of these manures left in the land after the root crop is sufficient for the requirements of the succeeding barley crop. Unless, therefore, barley is grown for two years in succession on the same land, or after a crop of wheat or oats, the question of manuring does not arise.

Experiments have been carried out to test the effect of applications of sulphate of ammonia, superphosphate, and kainit alone and in combination, and the results obtained indicate that a mixture of 1 cwt. of sulphate of ammonia, 3 cwt. of superphosphate, and 3 cwt. of kainit per statute acre is the most remunerative dressing on most barley soils.

On soils that are too rich, or on lea land, the application of from 2 to 3 cwt. of kainit per statute acre has been found efficacious in preventing an overgrowth of straw, and also in improving the quality of the grain. It is advisable to apply this manure at least ten days before sowing the corn.

The Department desire to express their thanks to Messrs. Arthur Guinness, Son & Co., Ltd., and Mr. J. H. Bennett, Ballincurra, Co. Cork, who undertook the valuation of the samples from the plots and for other valuable assistance in connection with these investigations.

II.—MEADOW HAY.

The experiments on the manuring of meadow hay in 1910 were similar to those of preceding years, and were carried out at fifteen centres in the counties of Antrim, Armagh, Cork, Down, Dublin, Kildare, Meath, Tyrone, and Westmeath.

The plan of the experiment, with full details as to centres, manures applied, yield per acre, and estimated profits, is given in the table on page 250.

The following table summarises the results obtained:—

Plot No.	Manures applied per statute acre.	Average Yield of Hay per statute acre.	Increase due to Manures.	Value of Increase at 2s. per cwt.	Cost of Manures.	Estimated Profit per statute acre.
		T. C. Q.	T. C. Q.	£ s. d.	£ s. d.	£ s. d.
1	No manure,	1 14 2	—	—	—	—
2	Ten tons of farmyard manure.	2 5 1	0 10 3	1 1 6	2 0 0	0 18 6 (Loss).
3	One cwt. nitrate of soda,	2 2 1	0 7 3	0 15 6	0 11 6	0 4 0
4	One cwt. nitrate of soda, 2 cwt. of superphosphate.	2 7 1	0 12 3	1 5 6	0 18 0	0 7 6
5	One cwt. nitrate of soda, 2 cwt. superphosphate, 2 cwt. kainit.	2 10 1	0 15 3	1 11 6	1 3 6	0 8 0
6	One cwt. nitrate of soda, 2 cwt. superphosphate, 2 cwt. kainit (kainit ap- plied not later than 30th November).	2 10 0	0 15 2	1 11 0	1 3 6	0 7 6

The results obtained in 1910 are, on the whole, very similar to those of the nine preceding years. The figures in the above table show that on the average of all the centres the heaviest yield of hay was obtained from the plots to which was applied, at the rate of 5 cwts. per acre, a mixture containing each of the three important ingredients of manures, viz., nitrogen, phosphates, and potash. While this is true of the average results, it should be noted that at five individual centres the highest yield was obtained on plots receiving either a dressing of 10 tons of farmyard manure or a mixture of 3 cwts. of nitrate of soda and superphosphate in the proportion of one to two.

The general result, therefore, indicates that the mixture applied on plots 5 and 6 may be relied on to give a substantial and, in most cases, a profitable increase in the crop.

On plot 4 the same mixture, but without the kainit, was applied,

and in a few cases this was more profitable than the complete mixture. Such a result may be expected on land which is in good heart; but even then the increase in the hay crop does not fully represent the advantages derived from the use of manures containing potash, as the quality of the hay is improved, and, further, the growth of clovers and bottom grasses in the aftermath is stimulated, thus improving the subsequent grazing.

MEADOW HAY EXPERIMENT:—MANURIAL TEST.

Table showing the Returns per Statute Acre from each Centre.

Name and Address of Farmer.	County.	Character of Soil.	Plot 1. No. Manure.	Plot 2. 10 tons Farm- yard Manure.	Plot 3. 1 cwt. Nitrate of Soda.	Plot 4. 1 cwt. Nitrate of Soda, 2 cwt. Super- phos- phate.	Plot 5. 1 cwt. Nitrate of Soda, 2 cwt. Super- phos- phate, 2 cwt. Kainit.	Plot 6. 1 cwt. Nitrate of Soda, 2 cwt. Super- phos- phate, 2 cwt. Kainit (applied not later than Nov. 30th).
			T. C. Q.	T. C. Q.	T. C. Q.	T. C. Q.	T. C. Q.	T. C. Q.
R. Gregg, Broughshane, Ballymena.	Antrim,	Clay loam	1 10 3	2 12 2	1 10 2	2 10 1	2 16 3	2 16 1
D. Patterson, Bally- watt, Dervock.	"	Medium loam,	1 19 3	2 5 0	2 7 2	2 11 1	2 9 1	2 13 3
J. H. Gray, Glenanne,	Armagh,	Light (Gravel subsoil).	1 4 3	2 6 3	1 14 1	2 10 2	2 13 1	2 8 2
J. W. Fahy, Killelea, Ovens.	Cork, W.	Sandy loam,	1 15 2	2 14 0	2 6 0	2 19 2	2 14 3	2 14 2
R. Rourke, Clogher, Downpatrick.	Down,	Gravelly loam,	2 5 0	3 2 2	2 12 2	2 15 0	2 17 2	3 0 0
W. J. Young, Annahin- chago, Banbridge.	"	Loam,	1 11 2	1 17 2	1 17 1	1 19 2	2 1 3	2 2 0
S. Robinson, Grangee, Millisle.	"	Clay loam,	2 5 3	2 8 1	2 4 2	2 6 0	2 10 0	2 15 3
R. Taylor, Newtown, Ballyedmonduff.	Dublin,	Granite loam,	0 15 0	1 18 2	1 3 0	1 10 1	1 16 0	1 14 3
J. McDonnell, Baldrum- mon, Lusk.	"	Clay soil,	1 4 3	1 10 1	1 14 0	1 14 1	1 12 3	1 10 0
L. Sweeney, Barrella- town, Naas.	Kildare,	Loam,	1 16 0	1 18 0	1 17 3	2 9 2	2 9 2	2 6 3
P. Heydon, Ballyraggan, Balinglass.	"	Light loam,	1 7 3	2 4 3	1 16 1	1 14 2	2 0 0	2 2 0
P. Duffy, Leggha, Castletown.	Meath,	Peaty,	1 13 0	1 17 2	2 3 0	2 2 1	2 5 1	2 2 3
M. Flynn, Rothrone, Enfield.	"	Medium loam,	2 8 0	2 9 2	2 12 2	2 9 1	2 11 3	2 14 2
M. McFarland, Tulna- cross, Cookstown.	Tyrone,	Heavy,	2 7 2	2 13 3	3 1 0	3 5 2	3 17 2	3 12 0
W. Doyle, Cloncrave, Kinnegad.	Westmeath,	Loam,	1 11 2	2 1 2	2 3 2	2 13 0	2 17 1	2 16 0
Average yield per statute acre,	—	—	1 14 2	2 5 1	2 2 1	2 7 1	2 10 1	2 10 0
Increase due to manures,	—	—	—	0 10 3	0 7 3	0 12 3	0 15 3	0 15 3
Value of Increase: Hay at 2s. per cwt.	—	—	—	£ s. d. 1 1 6	£ s. d. 0 15 6	£ s. d. 1 5 6	£ s. d. 1 11 6	£ s. d. 1 11 0
Cost of manures.	—	—	—	2 0 0	0 11 6	0 18 0	1 3 8	1 3 6
Estimated profit per statute acre,	—	—	—	0 18 6 (Loss).	0 4 0	0 7 6	0 8 0	0 7 6

For the purposes of comparison the average results obtained during the nine seasons 1901-9, together with the 1910 results, are shown in the following table:—

	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5	Plot 6
	No. Manure.	10 tons Farm- yard Manure.	1 cwt. Nitrate of Soda.	1 cwt. Nitrate of Soda, 2 cwt. Super- phosphate.	1 cwt. Nitrate of Soda, 2 cwt. Super- phosphate, 2 cwt. Kainit.	1 cwt. Nitrate of Soda, 2 cwt. Super- phosphate, 2 cwt. Kainit (applied not later than Nov. 30th).
	T. C. Q.	T. C. Q.	T. C. Q.	T. C. Q.	T. C. Q.	T. C. Q.
Average yield per statute acre for 9 years, 1901-9.	1 10 2	2 2 3	1 17 3	2 3 2	2 8 0	*2 9 2
Estimated profit per statute acre for 9 years, 1901-9.	-	£ s. d. 0 14 0 (Loss).	£ s. d. 0 4 2	£ s. d. 0 10 8	£ s. d. 0 16 0	£ s. d. *0 8 10
1910.	T. C. Q.	T. C. Q.	T. C. Q.	T. C. Q.	T. C. Q.	T. C. Q.
Average yield per statute acre.	1 14 2	2 5 1	2 2 1	2 7 1	2 12 1	2 10 0
Estimated profit per statute acre.	-	£ s. d. 0 18 6 (Loss).	£ s. d. 0 4 0	£ s. d. 0 7 6	£ s. d. 0 8 0	£ s. d. 0 7 6

* 3 years only.

The use of nitrate of soda alone is not recommended for meadow hay, unless under exceptional circumstances.

The 10 tons of farmyard manure applied on plot 2 gave an average increase of 10½ cwt. per acre, and, as mentioned already, in a few cases yielded the heaviest crop. If the hay crop is charged with the full cost of the manure (4s. per ton), a loss of 18s. 6d. per acre is incurred; but if, on the other hand, only half the cost is charged to the hay crop, a profit of 1s. 6d. is obtained. In this connection it should be remembered that, as in the case of the results obtained from the application of a potash manure, the actual increase in the weight of hay does not fully represent the beneficial effects of an application of dung. Farmyard manure has a lasting influence, and subsequent crops derive considerable benefit from a single dressing.

Since 1907 an extra plot, No. 6, has been included, with the same mixture as for plot 5, the kainit, however, being applied not later than the 30th November. Reference to the table above will show that in 1910 no advantage was obtained from the early application of kainit. In the average for the three preceding years the

early use of kainit produced a slightly heavier yield, but not sufficient to warrant the extra expense incurred in applying this manure separately.

It is necessary to explain that during the past four seasons the average profit generally has been less than in the earlier years. This is partly due to the increased price of the artificial manures. It is owing to this fact, as well as to the smaller number of centres at which the effects of the early application of kainit were tested in 1907-9, that in the table on page 251 there is so much difference between the average profit from plots 5 and 6.

To sum up, the results obtained each year for the past ten years have shown the heaviest yield and greatest profit from the application of 1 cwt. nitrate of soda, 2 cwts. superphosphate, and 2 cwts. kainit per statute acre. This mixture, therefore, is recommended for meadow land in Ireland.

The superphosphate and kainit should be applied before the end of February. These two manures may be mixed together, but the mixture should then be sown without delay. The nitrate of soda should be applied separately, early in April.

The mixture of superphosphate and kainit may be applied with advantage to pasture if the soil is dry, but on black or moory soils from 6 to 8 cwts. basic slag and from 2 to 3 cwts. kainit per statute acre, applied in November, would probably give better and certainly more lasting results.

III.—POTATOES.

A.—MANURIAL TEST (Old Series).

The experiments on the manuring of potatoes carried out in 1910 were similar to those of preceding years, and as in the last five years an additional Plot (No. 7) was included with the object of testing the effect of sulphate of potash in comparison with muriate of potash. Briefly stated, the object of these experiments is to indicate what use can be made of artificial manures by way of supplementing applications of farmyard manure to the potato crop.

Experiments were conducted at thirty-two centres in Counties Antrim, Carlow, Cavan, Clare, Cork, Fermanagh, Kerry, Londonderry, Longford, Louth, Meath, Queen's, Roscommon, Tipperary, Tyrone, Waterford, Westmeath, Wexford, and Wicklow. In each county the experiments were under the direct supervision of the county agricultural instructor.

As the number of experiments in 1910 was so great it has not been found possible to tabulate the results from individual centres in a convenient and easily readable form, and only the general average results of the experiments for all the counties are shown. These are given in the following table:—

Plot	Manure applied per statute acre.	Average total yield per statute acre.		Increase due to Manures.		Cost of Manures.			Estimated profit per statute acre.		
		T.	C.	T.	C.	£	s.	d.	£	s.	d.
1	No manure,	4	7	—	—	—	—	—	—	—	—
2	20 tons farmyard manure,	9	15	5	8	4	0	0	6	2	0
3	15 tons farmyard manure,	8	12	4	5	3	0	0	4	18	0
4	15 tons farmyard manure,	9	12	5	5	3	13	6	6	3	6
5	1 cwt sulphate of ammonia,										
	15 tons farmyard manure,	10	14	6	7	4	6	6	7	12	6
	1 cwt. sulphate of ammonia,										
	4 cwt. superphosphate,										
6	15 tons farmyard manure,	11	10	7	3	4	17	0	8	12	0
	1 cwt. sulphate of ammonia,										
	4 cwt. superphosphate,										
7	1 cwt. muriate of potash,	11	5	6	18	4	17	9	7	19	3
	15 tons farmyard manure,										
	1 cwt. sulphate of ammonia,										
	4 cwt. superphosphate,	11	5	6	18	4	17	9	7	19	3
	1 cwt. sulphate of potash,										

In calculating the profits obtained, the following prices have been assigned to the different manures:—Farmyard manure, 4s. per ton; sulphate of ammonia, £13 10s. per ton; superphosphate, £3 5s. per ton; muriate of potash, £10 10s. per ton, and sulphate of potash,

£11 5s. per ton. Potatoes were valued at 2s. per cwt. for saleable and 1s. per cwt. for small and diseased.

The figures in the above table generally confirm those obtained in previous years. Each application of manure, or mixture of manures, has produced an increase in the crop. The artificial manures have yielded a considerable profit per acre, the amounts being somewhat higher than the average of former years, as the next table shows.

These experiments fully justify the advice given in previous reports that, as a general rule, and especially where it is limited in amount, farmers should apply dung in moderate quantities, and supplement it with suitable artificial manure. This is supported by the figures contained in the following table:—

Plot	Manure applied per statute acre.	Total Yield of Potatoes per acre.	Increase over Yield from 15 tons Dung.	Cost of Manures in excess of 15 tons Dung.	Estimated Profit from use of artificials	Estimated average Profit from use of same artificials for 9 years 1901-9
		T. C.	T. C.	£ s. d.	£ s. d.	£ s. d.
3	15 tons farmyard manure, . . .	8 12	—	—	—	—
4	15 tons farmyard manure, 1 cwt sulphate of ammonia, . . .	9 12	1 0	0 13 6	1 5 6	0 18 7
5	15 tons farmyard manure, 1 cwt. sulphate of ammonia, 4 cwt. superphosphate, . . .	10 14	2 2	1 6 6	2 14 6	1 16 6
6	15 tons farmyard manure, 1 cwt. sulphate of ammonia, 4 cwt. superphosphate, 1 cwt. muriate of potash, . . .	11 10	2 18	1 17 0	3 14 0	3 1 0
7	15 tons farmyard manure, 1 cwt. sulphate of ammonia, 4 cwt. superphosphate, 1 cwt. sulphate of potash, . . .	11 5	2 13	1 17 9	3 1 3	*2 13 4

* Average for 4 years, 1906-9.

These figures show that the most suitable mixture of artificial manures that can be used to supplement a moderate application of dung is one which is complete, or, in other words, one which contains nitrogen, phosphates, and potash.

B.—MANURIAL TEST (New Series).

A new series of experiments was devised in 1908 with the object of ascertaining what quantity of each ingredient the mixture should contain. The same three manures were applied to each plot in addition to a moderate dressing of dung, but the quantity of each ingredient was varied. In 1910 these experiments were conducted at fifty centres in Counties Antrim, Armagh, Cavan, Cork, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kilkenny, King's,

Leitrim, Longford, Louth, Mayo, Meath, Monaghan, Queen's, Roscommon, Tipperary, Tyrone, Waterford, Wexford, and Wicklow. The average results of the new series of experiments are shown in the following table:—

Plot	Manures applied per Statute Acre.	Average yield per Statute Acre.			Value of crop, after deducting cost of Manures, saleable at 2s. per cwt. small and diseased at 1s. per cwt.	Average value of crop for 2 years, 1908-9,
		Saleable.	Small and Diseased	Total.		
1	15 tons Farmyard Manure, .	T. C. 6 2	C. 38	T. C. 8 0	£ s. d. 11 2 0	£ s. d. —
2	15 tons Farmyard Manure, . 1 cwt. Sulphate of Ammonia, 3 cwt. Superphosphate, 1 cwt. Muriate of Potash, .	} 8 0	44	10 4	13 10 3	15 19 6
3	15 tons Farmyard Manure, . 1 cwt. Sulphate of Ammonia, 4 Cwt. Superphosphate, . 1 cwt. Muriate of Potash, .					
4	15 tons Farmyard Manure, . 1 cwt. Sulphate of Ammonia, 5 cwt. Superphosphate, 1 cwt. Muriate of Potash, .					
5	15 tons Farmyard Manure, . 1½ cwt. Sulphate of Ammonia, 4 cwt. Superphosphate, 1 cwt. Muriate of Potash, .	} 8 6	44	10 10	13 15 9	16 10 0
6	15 tons Farmyard Manure, . 2 cwt. Sulphate of Ammonia, 4 cwt. Superphosphate, . 1 cwt. Muriate of Potash, .					
7	15 tons Farmyard Manure, . 1 cwt. Sulphate of Ammonia, 4 cwt. Superphosphate, 1½ cwt. Muriate of Potash, .					
8	15 tons Farmyard Manure, . 1 cwt. Sulphate of Ammonia, 4 cwt. Superphosphate, . 2 cwt. Muriate of Potash, .	} 8 9	43	10 12	13 17 3	16 11 6
		} 8 11	46	12 17	13 17 6	16 17 0
		} 8 10	43	10 13	14 0 9	16 17 0
		} 8 13	44	10 17	14 2 6	16 17 0

For convenient reference and comparison the average results are summarised briefly in the three following tables:—

Varying quantities of Superphosphate.

Plot	Manures Applied per Statute Acre.	1910.			Average of two years 1903-9.		
		Total yield per Statute Acre.		Value of crop after deducting cost of manures.	Total yield per Statute Acre.		Value of crop after deducting cost of manures.
		T. c.	£ s. d.		T. c.	£ s. d.	
2	3 cwt. superphosphate with Dung, Sulphate of Ammonia and Muriate of Potash. .	10 4	13 10 3		11 6	15 19 6	
3	4 cwt. Superphosphate, do.,	10 8	13 15 0		11 12	16 11 0	
4	5 cwt. Superphosphate, do., .	10 10	13 15 9		11 14	16 10 0	

Varying quantities of Sulphate of Ammonia.

Plot	Manures Applied per Statute Acre.	1910.			1908-9.		
		Total yield per Statute Acre.		Value of crop after deducting cost of manures.	Total yield per Statute Acre.		Value of crop after deducting cost of manures.
		T. c.	£ s. d.		T. c.	£ s. d.	
3	1 cwt. Sulphate of Ammonia, with Dung, Superphosphate and Muriate of Potash, .	10 8	13 15 0		11 12	16 11 0	
5	1½ cwt. Sulphate of Ammonia, do., .	10 12	13 17 3		11 16	16 11 6	
6	2 cwt. Sulphate of Ammonia, do., .	10 17	13 17 6		12 4	16 17 0	

Varying quantities of Muriate of Potash.

Plot	Manures Applied per Statute Acre.	1910.			1908-9.		
		Total yield per Statute Acre.		Value of crop after deducting cost of manures.	Total yield per Statute Acre.		Value of crop after deducting cost of manures.
		T. c.	£ s. d.		T. c.	£ s. d.	
3	1 cwt. Muriate of Potash, with Dung, Superphosphate and Sulphate of Ammonia, .	10 8	13 15 0		11 12	16 11 0	
7	1½ cwt. Muriate of Potash, do., .	10 13	14 0 9		11 18	16 17 0	
8	2 cwt. Muriate of Potash, do., .	10 17	14 2 6		12 1	16 17 0	

The results differ but slightly from the average of the two previous years. In only one plot (No. 2) does the quantity of any manurial ingredient applied fall below the quantity specified in the Department's standard dressing for potatoes; it is interesting to note that in each year this plot has produced the smallest yield.

Plot No. 3 forms the basis of the experiment, and the additional quantities of one or other ingredient applied to the remaining plots produced in each case only a sufficient increase to more than slightly repay the extra expenditure. These results do not warrant any change in the mixture which has been recommended in previous years, and which has continued to give such eminently satisfactory returns. The mixture is as follows:—

- 1 cwt. Sulphate of Ammonia.
- 4 cwt Superphosphate.
- 1 cwt. Muriate of Potash.

This conclusion is very considerably strengthened when the results of last year's experiments are compared with the average results of similar experiments conducted during the nine previous years as given in the following table:—

Manures applied per Statute Acre.	1910.			1901-9.		
	Average total yield per acre.		Estimated Average Profit from use of manures.	Average total yield per acre.		Estimated average Profit from use of manures
No Manure,	T. C.		£ s. d.	T. C.		£ s. d.
	4 7		—	4 0		—
20 tons Farmyard Manure, .	9 15		6 2 0	9 1		5 14 4
15 tons Farmyard Manure, .	8 12		4 18 0	8 4		5 4 0
15 tons Farmyard Manure, 1 cwt. Sulphate of Ammonia,	9 12		6 3 6	9 2		6 1 6
15 tons Farmyard Manure, 1 cwt. Sulphate of Ammonia, 4 cwt. Superphosphate, .	10 14		7 12 6	9 18		7 0 0
15 tons Farmyard Manure, 1 cwt. Sulphate of Ammonia 4 cwt. Superphosphate, 1 cwt. Muriate of Potash, .	11 10		8 12 0	10 15		8 3 11
15 tons Farmyard Manure, 1 cwt. Sulphate of Ammonia, 4 cwt. Superphosphate 1 cwt. Sulphate of Potash, .	11 5		7 19 3	10 10		*7 10 6

* Average for 4 years, 1906-9.

C.—VARIETY TEST.

This experiment, designed to test the relative cropping capabilities of different varieties of potatoes, was conducted at thirty-two centres in seventeen counties. The average returns of all the varieties grown in each county are given in Table I. (pages 260-1), together with the average total yield per statute acre.

COUNTY EXPERIMENTS.

The following summary of the results comprised in Table I. is given for convenient reference:—

Variety of Potato.	Saleable.		Small and Diseased.		Total.	
	T.	C.	T.	C.	T.	C.
MAIN-CROP VARIETIES.—						
Duchess of Cornwall,	8	13	1	19	10	12
Factor,	8	11	2	1	10	12
Up-to-Date,	8	8	2	1	10	9
Shamrock,	8	16	1	11	10	7
Champion,	6	12	2	15	9	7
Irish Queen,	7	10	1	8	8	18
Black Skerry	6	3	1	11	7	14
MID-SEASON VARIETIES.—						
British Queen,	7	12	2	6	9	18
Abundance	6	19	2	6	9	5

CONGESTED DISTRICTS EXPERIMENTS.

A variety test was also carried out at twenty-eight centres in congested districts under the supervision of the Department's agricultural overseers. The average results are given below:—

Variety of Potato.	Saleable.		Small.		Diseased.		Total.	
	T.	C.	T.	C.	T.	C.	T.	C.
MAIN-CROP VARIETIES.—								
Erin's Best,	8	3	2	5	0	8	10	16
Up-to-Date,	8	1	1	9	0	18	10	8
Bumper,	8	4	1	11	0	9	10	4
Beauty of Bute,	7	12	1	16	0	16	10	4
Shamrock,	8	6	1	9	0	1	9	16
Champion,	6	15	1	15	1	3	9	13
Duchess of Cornwall,	7	5	1	7	0	17	9	9
Irish Queen,	7	8	1	1	0	14	9	3
MID-SEASON VARIETIES.—								
British Queen,	6	0	1	8	1	3	8	11
Abundance,	4	18	1	3	1	4	7	5

As in previous years, the varieties of the Up-to-date type in the county experiments have produced the heaviest crops. Factor and Duchess of Cornwall so closely resemble Up-to-date that they may be regarded as identical with that variety.

Shamrock, however, has given the heaviest yield of marketable tubers both in the county experiments and those in congested districts. This variety is an excellent disease resister, and the percentage of diseased tubers present is usually very small. The cooking quality, however, is variable, and often distinctly bad: this will tend to prevent it becoming popular, notwithstanding its exceptional strong disease resisting qualities.

Erin's Best, which is a variety of Northern Star type, gave the heaviest total yield of any variety tested, but the percentage of small tubers is very high.

Bumper is a variety of recent introduction, and is worthy of further trials. The tubers are round in shape and white skinned.

Champion gave the largest total quantity of small and diseased tubers in both series.

Irish Queen produced more saleable tubers than Champion, but gave a smaller total yield.

Black Skerry gave the lowest return in point of both total crop and saleable tubers.

In the mid-season varieties British Queen proved superior to Abundance in both series of experiments.

D.—SPROUTING SEED POTATOES.

Late Varieties.

During the past season these experiments were carried out in fourteen counties at sixty centres, and also at 228 centres in congested districts. At each centre the tests were made under similar conditions as to soil, manuring, variety, and cultivation, the only difference being that the seed for one plot was sprouted (as explained in Leaflet No. 58), and the seed for the other plot was not. (*See page 262.*)

POTATO EXPERIMENT:—

TABLE I.—Showing the Average Returns

County.	No. of Centres.	MAINCROP.																		
		Up-to-Date.				Duchess of Cornwall.				Factor.				Irish Queen.						
		Saleable		Small		Total.		Saleable		Small		Total.		Saleable		Small				
		T.	C.	C.	T.	C.	T.	C.	C.	T.	C.	T.	C.	C.	T.	C.	C.	T.		
Cork. . . .	2	10	14	31	12	5	9	5	30	10	15	13	5	18	14	3	8	3	17	9
Down, . . .	3	10	10	50	13	9	13	3	49	15	12	10	4	50	12	14	8	1	47	10
Dublin, . . .	2	6	7	43	8	10	5	16	32	7	8	5	12	47	7	19	4	19	24	6
Galway, . . .	1	5	18	52	8	10	6	12	37	8	9	6	3	39	8	2	6	8	48	8
Kerry, . . .	2	8	9	34	10	3	10	4	25	11	9	7	6	61	10	7	8	5	16	9
Kilkenny, . . .	2	4	18	102	10	0	6	2	91	10	13	6	16	89	11	5	6	14	43	8
King's . . .	1	11	2	29	12	11	10	2	38	12	0	8	11	39	10	10	7	13	31	9
Londonderry, . .	1	10	10	58	13	8	7	15	47	10	2	8	18	48	11	6	7	3	37	9
Meath, . . .	2	9	10	28	10	18	10	8	29	11	17	8	16	32	10	8	8	11	25	9
Queen's, . . .	3	6	6	18	7	4	5	3	18	6	1	5	9	21	6	10	4	19	20	5
Roscommon, . .	1	11	17	48	14	5	7	16	73	11	9	11	2	46	13	8	9	13	27	11
Tipperary N.R., .	1	5	5	18	6	3	6	2	19	7	1	7	14	12	8	6	8	5	6	8
„ S.R., . . .	3	5	11	24	6	15	6	12	21	7	13	7	0	21	8	2	6	19	19	7
Tyrone, . . .	2	10	19	46	13	5	10	14	40	12	14	10	6	46	12	12	9	12	17	10
Westmeath, . .	1	5	11	20	6	11	7	0	29	8	9	6	17	25	8	2	4	18	22	6
Wexford, . . .	3	10	13	64	13	17	11	3	59	14	2	10	16	60	13	16	8	10	42	10
Wicklow, . . .	2	7	8	16	8	4	9	19	29	11	8	9	11	28	10	19	8	18	20	9
Average yield per Statute Acre.		8	8	41	10	9	8	13	39	10	12	8	11	41	10	12	7	10	28	8

VARIETY TEST.

per Statute Acre from each County.

												MID-SEASON.																							
Shamrock						Black Skerry.						Old Champion.						British Queen.						Abundance.											
Saleable			Small			Total.			Saleable			Small			Total.			Saleable			Small			Total.			Saleable			Small			Total.		
T.	C.		C.	T.	C.	C.	T.	C.	C.	T.	C.	C.	T.	C.	C.	T.	C.	C.	T.	C.	C.	T.	C.	C.	T.	C.	C.	T.	C.	C.					
11	7		24	12	11	6	16	17	7	13	8	18	41	10	19	9	3	20	10	3	6	19	28	8	7										
10	6		52	12	18	8	8	40	10	8	7	2	94	11	16	11	2	63	14	5	9	16	55	12	11										
9	17		29	11	6	5	2	34	6	16	5	15	56	8	11	6	15	47	9	2	5	8	30	6	18										
8	18		40	10	18	7	2	30	8	12	5	5	72	8	17	3	18	67	7	5	4	12	60	7	12										
10	2		26	11	8	8	15	22	9	17	8	8	40	10	8	7	6	59	10	5	9	3	43	11	6										
9	1		32	10	13	4	1	38	5	19	4	16	93	9	9	5	8	66	8	14	3	14	77	7	11										
11	4		21	12	5	5	3	31	6	14	6	1	68	9	9	7	19	44	10	3	7	2	44	9	6										
6	4		48	8	12	6	4	54	8	18	5	16	58	8	14	7	14	51	10	5	7	8	35	9	3										
8	9		30	9	19	7	19	41	10	0	7	16	36	9	12	9	5	64	12	9	6	10	76	10	6										
5	0		14	5	14	2	16	23	3	19	3	18	28	5	6	3	19	19	4	18	4	7	20	5	7										
10	2		47	12	9	7	9	38	9	7	7	15	61	10	16	12	2	41	14	3	7	12	72	11	4										
6	2		11	6	13	5	1	11	5	12	5	19	23	7	2	7	0	31	8	11	4	15	35	6	10										
9	8		22	10	10	5	16	19	6	15	6	5	42	8	7	5	2	39	7	1	6	14	32	8	6										
8	13		34	10	7	7	6	30	8	16	7	17	59	10	16	12	9	20	13	18	8	8	73	12	1										
5	11		28	6	19	5	8	25	6	13	5	8	40	7	8	5	9	40	7	9	5	9	28	6	17										
9	5		40	11	5	7	4	49	9	13	6	10	79	10	9	7	12	83	11	15	8	16	59	11	15										
8	19		26	10	5	4	6	16	5	2	8	11	27	9	18	7	4	15	7	19	7	10	24	8	14										
8	16		31	10	7	6	3	31	7	14	6	12	55	9	7	7	12	46	9	13	6	19	46	9	5										

TABLE showing Results of Experiments carried out in 1910 at two hundred and eighty-eight centres.

County.	No. of Experi- ments.	Average yield per Statute Acre.									Average gain in yield due to Sprout- ing.				
		Sprouted.						Unsprouted.							
		Saleable.		Small.		Total.		Saleable		Small.		Total.			
		T.	O.	T.	C.	T.	O.	T.	C.	T.	O.	T.	C.	T.	O.
Antrim,	12	14	5	1	14	15	19	10	14	2	12	13	6	2	13
Armagh,	8	10	15	2	5	13	0	7	8	1	15	9	3	3	17
Cavan,	1	3	18	2	14	6	12	3	6	3	8	6	9	0	8
Carlow,	1	8	8	3	10	11	18	8	2	3	2	11	4	0	14
Down,	7	11	16	2	8	14	4	10	6	2	8	12	14	1	10
Dublin,	2	7	16	1	19	9	15	6	12	1	13	8	5	1	10
Kerry,	4	10	12	1	2	11	14	7	8	1	5	8	13	3	1
Kilkenny,	8	8	13	2	19	11	12	6	10	2	4	8	14	2	18
King's,	2	9	17	5	0	14	17	8	17	4	2	12	19	1	18
Londonderry,	7	10	16	2	2	12	18	8	6	1	16	10	2	2	16
Roscommon,	1	14	18	2	10	17	8	11	16	2	15	14	11	2	17
Tyrone,	1	8	14	0	17	9	11	6	13	1	3	7	16	1	15
Waterford,	2	8	15	2	15	11	10	6	13	1	10	8	3	3	7
Wexford,	4	9	19	1	9	11	8	7	7	1	9	8	16	2	12
Congested Districts.	228	9	11	2	9	12	0	7	10	2	9	9	19	2	1

SUMMARY OF RESULTS OF EXPERIMENTS on the Sprouting of Late Potatoes for eight years, 1903-10.

	No. of Centres.	Yield per Statute Acre.				Average gain in yield due to Sprouting.	
		Sprouted Seed.		Unsprouted Seed.			
		T.	C.	T.	C.	T.	C.
1903,	12	11	1	9	8	1	13
1904,	34	11	6	8	13	2	13
1905,	91	12	17	10	16	2	1
1906,	67	11	9	9	2	2	7
1907,	67	10	6	8	6	2	0
1908,	67	13	0	10	15	2	5
1909,	50	12	19	10	4	2	15
1910,	288	12	5	10	1	2 1	4
Average of 676 tests, . . . . .	. . .	12	2	9	18	2	4

The advantages of the system of sprouting seed of late varieties of potatoes are fully set forth in the Department's leaflet No. 58 referred to above. These experiments, however, clearly show that the average increase in yield due to sprouting is over two tons per statute acre.

IV.—MANGELS.

A.—MANURIAL TEST (Old Series).

These experiments, designed with the object of discovering a simple and profitable method of manuring the mangel crop, were similar to those carried out in 1909. The experiments were conducted on nineteen farms in thirteen counties. The average results in each county, with a general average for all the counties, are shown in Table I., pp. 268-9.

For convenience of reference the general average results are reproduced in the following table:—

Plot	Manures applied per statute acre.	Average yield per acre.	Increase due to Manures.	Value of Increase.	Cost of Manures.	Estimated Profit per acre from use of manure
		T. C.	T. C.	£ s. d.	£ s. d.	£ s. d.
1	No Manure,	9 11	—	—	—	—
2	20 tons Farmyard Manure,	23 11	14 0	7 0 0	4 0 0	3 0 0
3	20 tons Farmyard Manure 4 cwts. Superphosphate,	26 8	16 17	8 8 6	4 13 0	3 15 6
4	20 tons Farmyard Manure 4 cwts. Superphosphate, 2 cwts. Sulphate of Ammonia,	29 10	20 8	10 4 0	6 0 0	4 4 0
5	20 tons Farmyard Manure, 4 cwts. Superphosphate, 2 cwts. Sulphate of Ammonia, 4 cwts. Kainit,	32 9	22 18	11 9 0	6 11 0	4 18 0
6	20 tons Farmyard Manure, 4 cwts. Superphosphate, 2 cwts. Sulphate of Ammonia, 4 cwts. Salt,	33 12	23 1	12 0 6	6 6 0	5 14 6
7	20 tons Farmyard Manure, 4 cwts. Superphosphate, 4 cwts. Salt, 2 cwts. of Nitrate of Soda (applied in 2 dressings after thinning).	31 16	22 5	11 2 6	6 2 0	5 0 6

In calculating the profits obtained, the following prices have been assigned to the different manures:—Farmyard manure, 4s. per ton; sulphate of ammonia, £13 10s. per ton; nitrate of soda, £11 10s. per ton; superphosphate, £3 5s. per ton; kainit, £2 15s. per ton; salt, £1 10s. per ton.

The mangels are estimated at 10s. per ton.

Plot 2 received an application of 20 tons of dung; each of Plots 3, 4, 5, 6, 7 was dressed with a different mixture of artificial manures in addition to this quantity of dung.

The effects of the artificial manures applied as supplementary dressings, along with the fixed quantity of 20 tons farmyard manure, are briefly set forth below.

Plot 3.—The addition of 4 cwts. superphosphate increased the yield by 57 cwts. per acre; the value of the increase was sufficient to cover the cost of the manure, and leave a fair profit.

Plot 4.—The further addition of 2 cwts. sulphate of ammonia increased the yield by 3 tons 11 cwts. per acre, and left a profit of 8s. 6d.

Plot 5.—The still further addition of 4 cwts. kainit, at a cost of 11s., increased the yield by 50 cwt., worth 25s., per acre over Plot 4. While, therefore, a dressing of 20 tons of dung produced a crop of 23 tons 11 cwt. per acre, the addition of a complete mixture of artificial manures increased the yield by 8 tons 18 cwts. which, after deducting the cost of the manures, left a profit of £1 18s.

Plot 6.—On this plot 4 cwts. salt was substituted for 4 cwts. kainit applied to Plot 5. At the majority of centres the salt produced the heavier crop, and the average yield was 23 cwts. per acre more than the kainit, and, as the cost was less than that of the kainit, a substantial profit of 16s. 6d. per acre is shown in favour of the salt.

A similar result has been obtained in previous years, and it may safely be assumed that on many soils the mangel crop will benefit by the inclusion of salt in the manurial dressing in preference to kainit. This is particularly so when sulphate of ammonia is used instead of nitrate of soda as a source of nitrogen.

Plot 7.—On this plot 2 cwts. sulphate of ammonia applied before sowing was replaced by an equal quantity of nitrate of soda applied in two successive top-dressings of 1 cwt. each after the plants were thinned. The yield from this plot was 36 cwts. less than that of Plot 6, and, even though the manure was cheaper, a reduced profit is shown.

The following table shows the average yield for the four years, 1906-9, together with the average returns for 1910.

Plot	Manures.	Average yield for 4 years 1906-9.		Average yield in 1910.	
		T.	C.	T.	C.
1	No Manure,	9	10	9	11
2	20 tons Farmyard Manure,	25	9	23	11
3	{ 20 tons Farmyard Manure, 4 cwts. Superphosphate, }	26	17	26	8
4	{ 20 tons Farmyard Manure, 4 cwts. Superphosphate, 2 cwts. Sulphate of Ammonia, }	29	14	29	19
5	{ 20 tons Farmyard Manure, 4 cwts. Superphosphate, 2 cwts. Sulphate of Ammonia, 4 cwts. Kainit, }	32	8	32	9
6	{ 20 tons Farmyard Manure, 4 cwts. Superphosphate, 2 cwts. Sulphate of Ammonia, 4 cwts. Salt, }	33	18	33	12
7	{ 20 tons Farmyard Manure, 4 cwts. Superphosphate, 2 cwts. *Nitrate of Soda, 4 cwts. Salt, }	33	9	31	16

*Applied in two top dressings after the mangels were thinned.

B.—MANURIAL TEST (New Series).

The results of the experiments carried out in previous years indicated that, in addition to a good dressing of dung, a suitable mixture of artificial manures for the mangel crop was composed of:— 4 cwts. superphosphate, 2 cwts. sulphate of ammonia, and 4 cwts. salt.

With a view to ascertaining whether the quantity of any of these three ingredients could, with advantage, be increased or reduced, a new series of experiments was devised in 1908. Each plot received a fixed quantity of farmyard manure, together with a mixture of artificial manures, in which the three ingredients were applied in varying quantities.

In 1910 this experiment was carried out on twenty-nine farms in sixteen counties. The plan of the experiment, together with the average results for each county, are set forth in Table II., pp. 270-71.

For the sake of easy reference and comparison, the general average results for all the counties are briefly summarised in the three following tables:—

Varying Quantities of Superphosphate.

Plot	Manures Applied per Statute Acre.	1910.			Average for two years, 1908-09.		
		Total yield per Statute Acre.		Value of crop after deducting cost of manures.	Total yield per Statute Acre.		Value of crop after deducting cost of manures.
		T.	C.	£ s. d.	T.	C.	£ s. d.
2	3 cwts. superphosphate with Dung, Sulphate of Ammonia and Salt,	33	2	10 8 3	33	11	10 10 8
3	4 cwts. Superphosphate, do.,	34	13	11 0 6	34	7	10 16 2
4	5 cwts. Superphosphate, do.,	34	13	10 17 3	34	12	10 15 0

Varying Quantities of Sulphate of Ammonia.

Plot	Manures Applied per Statute Acre.	1910.			Average for two years, 1908-09.		
		Total yield per Statute Acre.		Value of crop after deducting cost of manures.	Total yield per Statute Acre.		Value of crop after deducting cost of manures.
		T.	C.	£ s. d.	T.	C.	£ s. d.
5	1 cwt. Sulphate of Ammonia, with Dung, Superphosphate and Salt,	33	0	10 17 6	33	6	11 0 2
3	2 cwts. Sulphate of Ammonia, do.,	34	13	11 0 6	34	7	10 16 2
6	3 cwts. Sulphate of Ammonia, do.,	35	0	10 10 6	35	13	10 13 6

Varying Quantities of Salt.

Plot	Manures Applied per Statute Acre.	1910.				Average for two years, 1908-09.					
		Total yield per Statute Acre.		Value of crop after deducting cost of manures.		Total yield per Statute Acre.		Value of crop after deducting cost of manures.			
		T.	C.	£	s.	d.	T.	C.	£	s.	d.
7	2 cwts. Salt with Dung, Superphosphate and Sulphate of Ammonia,	32	14	10	4	0	32	9	9	19	7
3	4 cwts. Salt, do.,	34	13	11	0	6	34	7	10	16	2
8	6 cwts. Salt, do.,	33	19	10	10	6	34	3	10	10	7

In comparing the results obtained, it will be seen that 4 cwts. superphosphate, in conjunction with other manures, has given, during the past three years, more profitable returns than either 3 cwts. or 5 cwts. per statute acre.

The application of 1 cwt., 2 cwts., or 3 cwts. sulphate of ammonia, in conjunction with other manures, has directly influenced the yield. During each of the past three years, the highest average yield from all the plots has been obtained by the use of 3 cwts. sulphate of ammonia, but in no case has the increased yield been sufficient to pay for the extra cost of the manure. Whether it is more profitable to apply 1 cwt. rather than 2 cwts. sulphate of ammonia per acre probably depends, to some extent, on the season. The average of the two years 1908-09 shows that 1 cwt. was the more profitable, while in 1910, 2 cwts. per acre gave the better return.

A comparison of the effect of varying quantities of salt applied in conjunction with other manures, shows that in both seasons 4 cwts. was much more beneficial than 2 cwts., while the yield was reduced by increasing the quantity to 6 cwts. per acre.

Farmers, therefore, may safely rely upon the mixture of artificial manures which has in former years been recommended as suitable for the mangel crop when supplemented with a liberal dressing of dung. The mixture is:—

- 4 cwts. superphosphate.
- 2 cwts. sulphate of ammonia.
- 4 cwts. salt, per statute acre.

C.—VARIETY TESTS.

These experiments, carried out with a view to ascertaining the relative cropping powers of different varieties of mangels, were conducted at twenty-six centres in twelve counties. The average returns for each county, with the general average for all the counties, will be found in Table III., pp. 272.

The results are given for those varieties only which were tested at every centre. It will be seen from a comparison of the average results from 26 centres that both Prizewinner and Yellow Globe have given appreciably heavier crops than the Long Red Variety.

MANGEL EXPERIMENT:—

TABLE I.—Showing the Average Returns per

COUNTY.	No. of Centres.	Variety of Mangel.	PLOT 1.		PLOT 2.	
			No Manure.		20 tons Farm- yard Manure.	
			T.	C.	T.	C.
Carlow,	2	Yellow Globe.	17	14	28	14
Clare,	1	„	15	4	25	13
Cork,	1	„	0	0	24	6
Fermanagh,	1	„	8	18	21	10
Kilkenny,	1	„	27	4	35	4
King's,	1	„	9	19	16	6
Longford,	1	„	1	10	14	0
Louth,	3	„	4	8	12	8
Meath,	2	„	17	14	31	10
Tipperary (South), .	2	„	7	3	27	16
Waterford,	1	„	12	14	23	10
Wexford,	2	„	2	16	27	1
Wicklow,	1	„	1	15	18	11
Average yield per Statute Acre,			9	11	23	11
Increase due to Manures,			—	—	14	0
Value of the Increase : Mangels estimated at 10s. per ton.			—	—	£	s. d.
Cost of Manures,			—	—	7	0 0
Estimated profit per Statute Acre from use of Manures.			—	—	4	0 0
			—	—	3	0 0

MANURIAL TEST (OLD SERIES).

Statute Acre from each County.

Plot 3.	Plot 4.	Plot 5.	Plot 6.	Plot 7.
20 tons Farm-yard Manure. 4 cwt. Super-phosphate.	20 tons Farm-yard Manure. 4 cwt. Super-phosphate. 2 cwt. Sulphate of Ammonia.	20 tons Farm-yard Manure. 4 cwt. Super-phosphate. 2 cwt. Sulphate of Ammonia. 4 cwt. Kainit.	20 tons Farm-yard Manure. 4 cwt. Super-phosphate. 2 cwt. Sulphate of Ammonia. 4 cwt. Salt.	20 tons Farm-yard Manure. 4 cwt. Super-phosphate. 4 cwt. Salt. 2 cwt. Nitrate of Soda (applied after thinning in two dressings).
T. C.	T. C.	T. C.	T. C.	T. C.
31 0	36 10	39 8	39 15	37 7
33 17	36 13	39 18	41 15	35 17
26 7	28 17	31 10	34 16	30 18
25 19	30 11	30 0	29 11	27 10
36 9	37 13	42 18	44 6	42 6
17 11	21 2	23 7	22 9	18 14
15 10	24 0	26 0	26 10	24 0
15 3	21 19	24 5	23 11	23 16
34 6	36 11	40 16	43 1	41 13
30 18	32 4	33 3	34 12	32 1
30 1	28 6	28 13	33 14	32 14
27 18	30 10	32 14	35 5	34 18
22 12	24 12	29 3	29 3	28 15
26 8	29 19	32 9	33 12	31 16
16 17 £ s. d.	20 8 £ s. d.	22 18 £ s. d.	24 1 £ s. d.	22 5 £ s. d.
8 8 6	10 4 0	11 9 0	12 0 6	11 2 6
4 13 0	6 0 0	6 11 0	6 6 0	6 2 0
3 15 6	4 4 0	4 18 0	5 14 6	5 0 6

MANGEL EXPERIMENT :—

TABLE II.—Showing the Average Returns per

COUNTY.	No. of Centres.	Variety of Mangel.	Plot 1.		Plot 2.			
			20 tons Farm- yard Manure.	20 tons Farm- yard Manure.	20 tons Farm- yard Manure. 3 cwt. Super- phosphate. 2 cwt. Sul- phate of Am- monia. 4 cwt. Salt.			
			T.	C.	T.	C.		
Carlow,	1	Yellow Globe.	21	12	25	16		
Clare,	2	„	25	6	33	0		
Cork,	2	„	24	4	32	7		
Donegal,	1	„	13	11	15	16		
Dublin,	1	Long Red.	27	14	33	5		
Galway,	1	Yellow Globe.	25	7	30	18		
Kerry,	2	P. Y. Globe.	29	17	42	16		
Kildare,	1	P. Y. Globe.	23	5	28	10		
Kilkenny,	2	Yellow Globe.	32	11	42	9		
Meath,	2	Y.G. and L.R.	29	4	36	15		
Queen's,	2	Yellow Globe.	12	3	18	15		
Rosecommon,	2	Long Red.	29	14	38	17		
Tipperary, N.R.,	2	Yellow Globe.	23	6	30	2		
Tipperary, S.R.,	2	„	23	0	30	13		
Waterford.	2	„	24	18	36	19		
Wexford,	3	„	27	19	34	18		
Wicklow,	1	„	28	4	35	7		
Average yield per Statute Acre,			25	5	33	2		
Increase due to Artificial Manures,			—		7	17		
Value of Crop : Mangels estimated at 10s. per ton,			£	s.	d.	£	s.	d.
			12	12	6	16	11	0
Cost of Manures,			4	0	0	6	2	9
Value of crop after deducting cost of manures,			8	12	6	10	8	3
Average value of crop after deducting cost of manures for two years, 1908-9,			—		10	10	8	

MANURIAL TEST (OLD SERIES).

Statute Acre from each County.

PLOT 3.		PLOT 4.		PLOT 5.		PLOT 6.		PLOT 7.		PLOT 8.	
20 tons Farm-yard Manure.		20 tons Farm-yard Manure.		20 tons Farm-yard Manure.		20 tons Farm-yard Manure.		20 tons Farm-yard Manure.		20 tons Farm-yard Manure.	
4 cwt. Super-phosphate.		5 cwt. Super-phosphate.		4 cwt. Super-phosphate.		4 cwt. Super-phosphate.		4 cwt. Super-phosphate.		4 cwt. Super-phosphate.	
2 cwt. Sulphate of Ammonia.		2 cwt. Sulphate of Ammonia.		1 cwt. Sulphate of Ammonia.		3 cwt. Sulphate of Ammonia.		2 cwt. Sulphate of Ammonia.		2 cwt. Sulphate of Ammonia.	
4 cwt. Salt.		4 cwt. Salt.		4 cwt. Salt.		4 cwt. Salt.		2 cwt. Salt.		6 cwt. Salt.	
T.	C.	T.	C.	T.	C.	T.	C.	T.	C.	T.	C.
28	8	27	0	27	14	23	14	25	0	28	10
35	17	34	13	31	10	35	8	34	16	36	2
36	5	33	7	37	2	34	16	30	16	30	19
18	11	18	13	18	3	22	0	19	18	20	12
34	8	32	12	29	8	32	13	32	4	33	12
34	5	33	16	30	10	34	0	31	16	33	14
42	10	42	8	40	18	42	0	43	7	42	16
30	5	29	0	27	5	29	5	29	10	30	15
40	12	40	3	38	6	37	18	36	4	35	18
37	12	39	6	36	9	37	18	34	8	35	14
19	12	20	11	20	10	25	5	20	16	22	17
42	14	43	7	39	10	44	5	37	5	38	4
31	0	32	0	29	5	34	3	31	9	31	11
32	11	34	10	29	0	31	1	28	0	28	19
37	7	40	4	39	1	39	7	38	7	41	5
36	6	35	0	34	11	36	13	34	15	35	19
37	7	38	8	36	17	39	8	35	1	40	10
34	13	34	13	33	0	35	0	32	14	33	19
9	8	9	8	7	15	9	15	7	9	8	14
£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.	
17 6 6		17 6 6		16 10 0		17 10 0		16 7 0		16 19 6	
6 6 0		6 9 3		5 12 6		6 19 6		6 3 0		6 9 0	
11 0 6		10 17 3		10 17 6		10 10 6		10 4 0		10 10 6	
10 16 2		10 15 0		11 0 2		10 13 6		9 19 7		10 10 7	

MANGEL EXPERIMENT:—VARIETY TEST.

TABLE III.—Showing the Average Returns per Statute Acre from each County.

COUNTY.	No. of Centres.	Yellow Globe.	Prize Winner.	Golden Tankard.	Long Red.
		T. C.	T. C.	T. C.	T. C.
Carlow, . . .	1	24 7	23 7	22 10	30 10
Cork, . . .	5	39 10	42 2	27 9	30 19
Kerry, . . .	2	28 17	32 2	21 8	26 18
Kildare, . . .	1	22 10	27 5	17 15	20 0
King's, . . .	2	26 10	26 2	19 5	22 1
Leitrim, . . .	1	29 3	32 15	26 10	29 7
Limerick, . . .	4	29 9	33 12	22 17	26 1
Longford, . . .	1	14 7	21 12	15 2	18 6
Queen's, . . .	1	24 10	20 10	16 0	24 10
Roscommon, . . .	2	37 18	40 8	29 13	37 10
Tipperary N., . . .	2	20 1	20 12	17 0	19 12
Tipperary S., . . .	2	30 7	27 11	23 6	29 9
Wexford . . .	2	32 5	34 8	26 12	31 12
Average yield per Statute Acre.		30 2	32 1	23 2	27 11

V.—OATS.

A.—MANURIAL TEST (Old Series).

The experiments on the manuring of oats in 1910 were similar to those of previous years, except that an additional plot (No. 6) was included, with a view to testing the effect of a smaller quantity of the same mixture applied to Plot 5. The object of these experiments, which were carried out on fifteen farms in eleven counties, was to test the effects of artificial manures when used singly and in combination.

In Table I., pages 276-7, will be found the average results for each county, together with a general average for all the counties.

For convenient reference the general average figures are reproduced in the following table:—

Plot	Manures applied per Statute Acre.	Average Yield per Statute acre		Increase due to Manures.		Value of Increase.	Cost of Manures.	Estimated Profit per Statute Acre.
		Grain.	Straw	Grain.	Straw			
		cwt. qr	cwt.	cwt. qr	cwt.	£ s. d.	£ s. d.	£ s. d.
1	No manure,	17 2	29	—	—	—	—	—
2	1 cwt. Sulphate of Ammonia.	20 0	35	2 2	6	1 2 4	0 13 6	0 8 10
3	3 cwt. Superphosphate,	20 1	34	2 3	5	1 2 2	0 9 9	0 12 5
4	1 cwt. Sulphate of Ammonia, 3 cwt. Superphosphate.	22 2	38	5 0	9	2 0 2	1 3 3	0 16 11
5	1 cwt. Sulphate of Ammonia, 3 cwt. Superphosphate, 3 cwt. Kainit,	24 2	45	7 0	16	3 1 4	1 11 6	1 9 10
6	5 cwt. of the same mixture applied to plot 5,	22 2	40	5 0	11	2 3 2	1 2 6	1 0 8

In calculating the profits obtained, the following prices have been assigned to the different manures:—Sulphate of ammonia, £13 10s. per ton; superphosphate, £3 5s. per ton; kainit, £2 15s. per ton.

The grain was valued at 8d. per stone, and the straw at 1s. 6d. per cwt.

The effects of the application of the different manures were very similar to those obtained in previous years.

The plots manured with sulphate of ammonia and superphosphate, and with sulphate of ammonia, superphosphate and kainit, respectively, have invariably given profitable returns, but in the case of the plots manured with sulphate of ammonia, superphosphate, or kainit alone, the results have been irregular, sometimes profitable, sometimes not. Although in the experiments for the five years, 1901-5,* the plot dressed with kainit alone gave a slightly higher average yield than the "no manure" plot, it was decided to omit this plot in future trials, first because the profit realised from such an application was very small, and in fact at some centres resulted in a slight loss, and secondly because it is now generally understood that the most economical way to use potassic manures for cereals is in conjunction with nitrogenous and phosphatic manures.

The mixture of sulphate of ammonia and superphosphate applied on Plot 4 increased the crop to such an extent as to leave a profit of 16s. 11d. per acre, while the same mixture, with the addition of kainit, as applied on Plot 5, resulted in a profit of £1 9s. 10d. per

* See part No. 3 each of Vols. II., III., IV., V. and VI. of the Department's JOURNAL.

acre. As mentioned above, these two mixtures have given satisfactory returns in each of the nine years during which these experiments have been carried out.

The smaller quantity of the mixture applied to Plot 6 has reduced the profit to the extent of 9s. 2d. per acre.

While, therefore, farmers cannot always rely on getting a profitable increase in crop from the use of sulphate of ammonia, superphosphate or kainit when applied alone, yet they may be fairly confident of realising a profit when all three are used together in the same proportions as they were applied on Plots 5 and 6.

The average figures obtained in the experiments for the four years, 1906-9, together with the figures for 1910, are given in the following table:—

Plot	Manures Applied per Statute Acre.	Average yield for 4 years, 1906-9.		Average yield in 1910.	
		Grain	Straw	Grain	Straw
1	No Manure,	cwt. 16 qr. 3	cwt. 27	cwt. 17 qr. 2	cwt. 29
2	1 cwt. Sulphate of Ammonia	19 1	33	20 0	35
3	3 cwt. Superphosphate,	19 2	32	20 1	34
4	{ 1 cwt. Sulphate of Ammonia, } { 3 cwt. Superphosphate, }	22 3	39	22 2	38
5	{ 1 cwt. Sulphate of Ammonia, } { 3 cwt. Superphosphate } { 3 cwt. Kainit, }	23 2	42	24 2	45

B.—MANURIAL TEST (New Series).

The results of the experiments which have been carried out during the nine years, 1901-9, on the manuring of oats have shown that on the average the most suitable mixture that has been used in these experiments was that indicated on Plot 5 (Old Series), viz.: sulphate of ammonia, superphosphate, and kainit. In order to ascertain whether the proportion of the ingredients used in this mixture was the best, a new series of experiments was devised in 1908. On each plot in this series (with the exception of Plot 1) the same three manures were applied, but the proportion of each ingredient was varied.

Experiments were carried out on fourteen farms in eleven counties during 1910. The average results for each county, with the general average for all the counties, are shown in Table II., pages 278-9.

For convenient reference and comparison, the general average results are briefly stated in the two tables below:—

Varying Quantities of Superphosphate.

Plot	Manures Applied per Statute Acre.	1910.			Average of two years, 1908-9.		
		Total yield per Statute Acre.		Estimated profit from use of Artificial Manures.	Total yield per Statute Acre.		Estimated profit from use of Artificial Manures.
		Grain.	Straw.		Grain.	Straw.	
2	2 cwt. Superphosphate with Sulphate of Ammonia and Kainit, . . .	c. o.	cwt.	£ s. d.	c. q.	cwt.	£ s. d.
		19	3	37 0 16 4	21	3	34 1 8 10
3	3 cwt. Superphosphate do., . .	21	3	37 1 3 9	22	2	35 1 12 0
4	4 cwt. Superphosphate do., . .	22	2	39 1 7 6	22	1	35 1 7 7

Varying Quantities of Kainit.

Plot	Manures Applied per Statute Acre.	1910.			Average of two years, 1908-9.		
		Total yield per Statute Acre.		Estimated profit from use of Artificial Manures.	Total yield per Statute Acre.		Estimated profit from use of Artificial Manures.
		Grain.	Straw.		Grain.	Straw.	
3	2 cwt. Kainit with Sulphate of Ammonia and Superphosphate, . . .	c. q.	Cwt.	£ s. d.	c. q.	Cwt.	£ s. d.
		21	3	37 1 3 9	22	2	35 1 12 0
5	3 cwt. Kainit, do., . .	22	2	40 1 9 6	22	3	35 1 9 3
6	4 cwt. Kainit, do., . .	23	0	39 1 7 11	22	3	35 1 6 6

The results have not been uniform during the past three years, but, on the whole, distinctly the best results have been obtained from the use of the standard dressing of artificial manures which has been recommended in previous years, as follows:—

- 1 cwt. sulphate of ammonia.
- 3 cwt. superphosphate.
- 3 cwt. kainit per statute acre.

It should be observed that this dressing is recommended chiefly for oats grown on poor lea land, or for oats following a corn crop. It might also be applied to oats sown after a root crop to which farm-yard manure had not been applied.

In addition to increased yield, the following advantage will be derived from the use of such a mixture of artificial manures:—Grain of decidedly superior quality is produced; the plants brand better, and suffer less injury from attacks of insect pests, such as wireworms and leather jacket grubs, and the corn ripens earlier, so that it is ready for cutting sooner than would otherwise be the case.

OAT EXPERIMENT:—

TABLE I.—Showing the Average Returns

COUNTY.	No. of Centres.	PLOT 1.			PLOT 2.		
		No Manure.			1 cwt. Sulphate of Ammonia.		
		Grain.		Straw.	Grain.		Straw.
		cwt.	qr.	cwt.	cwt.	qr.	cwt.
Armagh,	1	20	1	34	23	1	44
Cavan,	1	24	2	38	26	1	42
Cork,	2	15	3	23	17	2	26
Donegal,	1	12	1	22	19	1	37
Down,	1	11	3	20	13	3	27
Dublin,	2	21	3	32	20	2	33
Limerick,	1	24	0	31	28	2	49
Longford,	1	16	0	30	17	0	32
Louth,	2	14	1	28	16	1	32
Roscommon,	1	16	3	28	18	2	38
Tyrone,	2	17	2	34	23	1	37
Average yield per statute acre,		17	2	29	20	0	35
Increase due to Manures,		—	—	—	2	2	6
Value of Increase: Grain at 8d. per stone and Straw at 1s. 6d. per cwt.		—	—	—	£	s.	d.
					1	2	4
Cost of Manures,		—	—	—	0	13	6
Estimated profit per statute acre from use of Manures.		—	—	—	0	8	10

MANURIAL TEST (OLD SERIES).

per Statute Acre from each County.

Plot 3.			Plot 4.			Plot 5.			Plot 6.		
3 cwt. Super-phosphate.			1 cwt. Sulphate of Ammonia. 3 cwt. Super-phosphate.			1 cwt. Sulphate of Ammonia. 3 cwt. Super-phosphate. 3 cwt. Kainit.			5 cwt. of the mixture applied to Plot 5.		
Grain.		Straw.	Grain.		Straw.	Grain.		Straw.	Grain.		Straw.
cwt.	qr.	cwt.	cwt.	qr.	cwt.	cwt.	qr.	cwt.	cwt.	qr.	cwt.
17	2	37	24	3	47	26	1	51	22	2	45
25	3	39	28	0	45	27	3	47	26	2	43
20	1	31	21	3	34	26	1	41	24	0	38
16	1	27	17	1	31	21	1	40	18	0	32
11	1	16	16	3	25	17	2	29	15	0	23
22	3	30	22	3	35	24	3	41	23	0	37
25	3	40	28	2	42	29	0	50	25	2	38
22	0	47	23	2	45	26	2	35	24	0	50
16	1	30	17	2	37	18	0	43	17	1	40
19	3	36	24	1	45	26	0	51	25	2	50
23	2	38	24	1	39	27	3	48	26	0	48
20	1	34	22	2	38	24	2	45	22	2	40
2	3	5	5	0	9	7	0	16	5	0	11
£ s. d.			£ s. d.			£ s. d.			£ s. d.		
1 2 2			2 0 2			3 1 4			2 3 2		
0 9 9			1 3 3			1 11 6			1 2 6		
0 12 5			0 16 11			1 9 10			1 0 8		

OAT EXPERIMENT:—

TABLE II.—Showing the Average Returns

COUNTY.	No. of Centres.	PLOT 1.		PLOT 2.			
		No Manure.		1 cwt. Sulphate of Ammonia. 2 cwt. Super-phosphate. 2 cwt. Kainit.			
		Grain.		Straw.		Grain.	
		cwt.	qr.	cwt.		cwt.	qr.
Antrim,	1	9	0	17		17	0
Armagh,	1	10	0	21		17	0
Cavan,	2	12	0	29		14	0
Cork,	1	15	1	18		21	3
Donegal,	1	18	0	28		25	0
Limerick,	2	19	0	26		20	1
Londonderry,	1	12	1	25		15	1
Mayo,	2	14	3	24		21	2
Monaghan,	1	13	2	51		18	1
Tyrone,	1	15	3	28		18	3
Westmeath,	1	24	1	22		30	3
Average yield per statute acre,		15	0	26		19	3
Increase due to Manures,		—	—	—		4	3
Value of Increase : Grain at 8d. per stone and Straw 1s. 6d. per cwt.		—	—	—		£ s. d. 2 1 10	—
Cost of Manures,		—	—	—		1 5 6	—
Estimated profit per statute acre from use of Manures,		—	—	—		0 16 4	—
Ditto, ditto, for two years, 1908-9,		—	—	—		1 8 10	—

MANURIAL TEST (NEW SERIES).

per Statute Acre from each County.

PLOT 3.			PLOT 4.			PLOT 5.			PLOT 6.			
1 cwt. Sulphate of Ammonia. 3 cwt. Super-phosphate. 2 cwt. Kainit.			1 cwt. Sulphate of Ammonia. 4 cwt. Super-phosphate. 2 cwt. Kainit.			1 cwt. Sulphate of Ammonia. 3 cwt. Super-phosphate. 3 cwt. Kainit.			1 cwt. Sulphate of Ammonia. 3 cwt. Super-phosphate. 4 cwt. Kainit.			
Grain.		Straw.	Grain.		Straw.	Grain.		Straw.	Grain.		Straw.	
cwt.	qr.		cwt.	qr.		cwt.	qr.		cwt.	qr.		
16	3		36	17	2	47	19	2	42	21	1	44
18	2		30	18	3	31	17	0	31	20	2	34
19	2		45	21	2	45	20	3	43	21	0	39
22	3		33	22	2	32	23	2	34	22	2	32
27	1		42	24	3	40	28	0	50	26	0	46
22	3		33	24	3	35	23	3	38	25	3	35
17	0		27	18	2	31	17	0	32	17	1	33
22	2		28	23	0	29	23	3	31	24	0	31
18	2		68	17	2	68	18	0	65	17	2	67
22	3		42	17	2	40	21	3	41	23	0	46
33	0		35	38	2	42	32	3	37	31	0	30
21	3		37	22	2	39	22	2	40	23	0	39
6	3		11	7	2	13	7	2	14	8	0	13
£ s. d.			£ s. d.			£ s. d.			£ s. d.			
2 12 6			2 19 6			3 1 0			3 2 2			
1 8 9			1 12 0			1 11 6			1 14 3			
1 8 9			1 7 6			1 9 6			1 7 11			
1 12 0			1 7 7			1 9 3			1 5 1			

C.—VARIETY

This experiment was designed to test the cropping powers of certain as "Potato" and "Black Tartarian." Experiments were carried each county, together with the general average yields of grain and Table III., below. The average yields of each variety obtained in table.

OAT EXPERIMENT: --

TABLE III.—Showing the Average Returns

COUNTY.	No. of Centres.	Potato.			Black Tartarian.		
		Grain.	Straw.	Grain.	Straw.		
		cwt.	qr.	cwt.	cwt.	qr.	cwt.
Cork,	1	24	2	41	24	0	37
*Down,	1	16	3	—	16	1	—
Galway,	1	19	0	33	19	1	31
*Kildare,	1	11	3	—	12	0	—
Leitrim,	1	25	1	43	28	0	50
Limerick,	1	28	2	60	25	0	40
Longford,	2	25	0	43	24	2	37
Roscommon,	3	26	3	43	28	3	66
Tipperary, N.R.,	1	21	2	28	20	3	26
Tipperary, S.R.,	1	15	3	25	15	2	21
Waterford,	2	20	0	39	20	0	33
Average yield per statute acre.		23	2	40	23	3	42
Ditto for 4 years, 1906-9,		21	1	35	22	2	33

* Not included in average.

TEST.

newer varieties of oats as compared with old-established kinds, such out at fifteen centres in ten counties. The average yields obtained in straw produced by each variety for all the counties, are given in similar experiments for the four years, 1906-9, are also shown in the

VARIETY TEST.

per Statute Acre from each County.

Banner.		Abundance.				Waverley.		Tartar King.			
Grain.		Straw.		Grain.		Straw.		Grain.		Straw.	
cwt.	qr.	cwt.	cwt.	qr.	cwt.	cwt.	qr.	cwt.	cwt.	qr.	cwt.
27	0	40	23	1	34	22	3	33	19	3	24
19	2	—	18	3	—	16	3	—	21	0	—
22	0	32	23	0	32	24	0	34	20	0	36
27	0	—	15	1	—	22	0	—	12	0	—
25	3	40	26	0	38	27	0	44	25	2	37
26	1	38	29	1	42	26	3	40	32	0	45
24	1	43	24	3	39	25	0	40	21	2	39
28	3	39	22	2	48	27	1	49	26	3	56
22	3	36	20	0	28	21	0	31	20	3	29
19	2	27	12	3	30	13	1	20	14	1	21
20	3	27	21	2	28	21	2	31	18	1	28
24	2	36	22	3	37	23	3	38	22	2	38
22	3	33	21	0	32	23	0	32	21	2	32

the turnip crop were preceding years, with armyard manure—to be applied to plot 6 sulphate of potash. in previous years.

- in combination with
used alone.

st the effects of the
ure, was carried out

h county are shown
reference the general
ulphate of potash,

FIGURE 1.

No.	Cost of Manures.			Estimated profit per statute acre.		
	£	s.	d.	£	s.	d.
4	4	0	0	2	1	7
0	2	0	0	2	11	7
0	2	13	0	3	11	0
5	3	6	6	3	3	11
6	3	14	9	3	7	8
5	3	1	8	3	12	4

In calculating the profits obtained the following prices have been assigned to the different manures:—Farmyard manure, 4s. per ton; superphosphate, £3 5s. per ton; basic slag, £3 5s. per ton; kainit, £2 15s. per ton. Turnips were valued at 8s. per ton.

The application of 20 tons of dung (Plot 2) may be regarded as a full dressing, and one object of the experiment was to determine whether equally heavy crops could be obtained on farms where the supply of dung is necessarily limited, by supplementing a lighter dressing of farmyard manure with suitable artificial manures.

A comparison of the average yields obtained on Plots 2 and 4 shows that where 4 cwt. superphosphate was used along with 10 tons of dung, a slightly heavier crop was obtained than where the dung was applied alone at the rate of 20 tons per acre.

This result is practically similar to those obtained in eight of the previous years' experiments. Only in one instance (1901) was the balance in favour of the heavier dressing of dung (to the extent of 10 cwt. of turnips per acre). There seems little doubt, therefore, that where farmyard manure is scarce, farmers may rely upon obtaining a perfectly satisfactory crop of turnips by using a lighter dressing of dung and supplementing it with an application of about 4 cwt. superphosphate per acre. The experiment was further intended to ascertain whether other forms of artificial manure (nitrogenous and potassic) could profitably be applied along with superphosphate (Plots 5, 6 and 7).

The results confirm those obtained in previous years, and they indicate that, while a somewhat heavier crop may be obtained by the addition of 1 cwt. sulphate of ammonia and 3 cwt. kainit to the standard dressing of 10 tons dung and 4 cwt. superphosphate per acre, the increased yield is produced at too great a cost to be profitable.

Comparing plot 7, to which the complete mixture of artificial manures was applied at the rate of 5 cwt., with Plot 6, which received 8 cwt. per acre, the results are distinctly in favour of the smaller dressing.

As a general rule where farmyard manure is applied to land in good condition, nitrogenous and potassic manures are not required by the turnip crop. On land, however, which is naturally poor, or in low condition, it is probable that such manures will pay for their application.

The use of a complete mixture of artificials has one decided advantage, inasmuch as a more even braird is obtained, the plants are stimulated in their early growth, and consequently suffer less injury from attacks of the Turnip Fly.

The second series of experiments designed to test the effects of artificial manures used alone was carried out on six farms in five counties. The detailed average results for each county will be

found on Table II. (page 289), but for convenience of reference the general average results are shown in the following table:—

MANURIAL TEST WITHOUT FARMYARD MANURE.

Plot	Manure applied per Statute Acre.	Average yield per statute acre.		Increase due to Manures		Cost of Manures.			Estimated profit per statute acre.		
		T.	C.	T.	C.	£	s.	d.	£	s.	d.
1	No Manure,	5	7	—	—	—	—	—	—	—	—
2	4 cwt. Superphosphate,	18	4	12	17	0	13	0	4	9	10
3	4 cwt. Superphosphate,	21	12	16	5	1	6	6	5	3	6
	1 cwt. Sulphate of Ammonia,										
4	4 cwt. Superphosphate,	24	2	18	15	1	14	9	5	15	3
	1 cwt. Sulphate of Ammonia,										
	3 cwt. Kainit,	25	16	20	9	2	12	1	5	11	6
5	6 cwt. Superphosphate,										
	1½ cwt. Sulphate of Ammonia,										
	4½ cwt. Kainit,										

The fact that phosphatic manures are all-important to the successful growth of turnips is so well known among farmers that it is hardly necessary to call attention to the results obtained on Plot 2, to which superphosphate was applied alone at the rate of 4 cwt. per statute acre, the crop produced being such as to leave an estimated profit from the use of the manure of £4 9s. 10d. per acre.

From a comparison of the figures referring to Plots 2, 3, and 4, an opinion can be formed as to the advisability of adding nitrogenous and potassic manures to the superphosphate. On Plot 3 the addition of 1 cwt. sulphate of ammonia increased the crop by 3 tons 8 cwt. per acre, the increased yield being sufficient to pay for the extra cost of the manure and leave a profit of 13s. 8d. The further addition of 3 cwt. kainit on Plot 4 gave an increase of 50 cwt. per acre over that obtained from the use of superphosphate and sulphate of ammonia, and left a profit of 11s. 9d. These figures indicate that when farmyard manure is not applied, more satisfactory returns, both as to yield of crop and as to profit, are likely to be obtained from the use of a *complete* mixture of manures than from the use of an *incomplete* mixture.

Plot 5 received a dressing of 6 cwt. superphosphate, 1½ cwt. sulphate of ammonia, and 4½ cwt. kainit, *i.e.*, half as much again of the same manures as were applied to Plot 4. This extra manuring resulted in an increased yield, as compared with Plot 4. The average profit per acre after deducting the cost of the manures, however, is slightly less than that obtained on Plot 4.

The following tables show the average results obtained in similar experiments for the four years, 1906-09, together with the average returns for 1910:—

(1) Artificial Manures used in combination with Farmyard Manure.

Manure.		Average yield for 4 years, 1906-9.		Average yield for 1910.	
		tons	cwt.	tons	cwt.
1	No Manure,	7	4	7	12
2	20 tons Farmyard Manure, . . .	22	13	22	16
3	10 tons Farmyard Manure . . .	19	2	19	1
4	{ 10 tons Farmyard Manure, . . . 4 cwt. Superphosphate, . . . }	23	10	23	2
5	{ 10 tons Farmyard Manure, . . . 4 cwt. Superphosphate, . . . 1 cwt. Sulphate of Ammonia, . . }	24	8	23	18
6	{ 10 tons Farmyard Manure, . . . 4 cwt. Superphosphate, . . . 1 cwt. Sulphate of Ammonia, . . 3 cwt. Kainit, }	25	8	25	8
7	{ 10 tons Farmyard Manure, . . . 5 cwt. of the same mixture as applied to Plot 6. }	—		24	7

(2) Artificial Manures used alone.

Manure.		Average yield per Statute Acre for 4 years 1906-9.		Average yield per Statute Acre for 1910.	
		tons	cwt.	tons	cwt.
1	No Manure,	4	14	5	7
2	4 cwt. Superphosphate,	16	19	18	4
3	{ 4 cwt. Superphosphate, 1 cwt. Sulphate of Ammonia, . . . }	18	12	21	12
4	{ 4 cwt. Superphosphate, 1 cwt. Sulphate of Ammonia, . . . 3 cwt. Kainit, }	21	9	24	2
5	{ 6 cwt. Superphosphate, 1½ cwt. Sulphate of Ammonia, . . 4½ cwt. Kainit, }	23	19	25	16

B.—MANURIAL TEST (New Series).

A new series of experiments was commenced in 1908 with a view to testing the following points:—

(1.) The effect of an increased dressing of superphosphate as compared with the dressing of 4 cwt. per statute acre previously recommended (a) in combination with farmyard manure, and (b) in combination with other manures containing nitrogen and potash.

(2.) The effect of basic slag as compared with superphosphate when used in conjunction either with farmyard manure or with other manures containing nitrogen and potash.

Two series of experiments were therefore conducted:—In Table III. (pp. 292-3) will be found the average results of the trials in which the two phosphatic manures were applied with farmyard manure, and in Table IV. (pp. 294-5) those where the complete mixture of artificials were used alone.

For easy reference and comparison the general average results are set forth in the following tables:—

IB.—Artificial Manures used in combination with Farmyard Manure.

Varying Quantities of Superphosphate.

Plot	Manures applied.	1910.		Average for 2 years, 1908-9.	
		Total Yield per Statute Acre.	Value of crop after deducting cost of Manures.	Total Yield per Statute Acre.	Value of crop after deducting cost of Manures.
		T. c.	£ s. d.	T. c.	£ s. d.
1	4 cwt. Superphosphate with Dung,	22 6	6 5 5	23 16	6 18 3
2	5 cwt. Superphosphate do.,	23 3	6 8 11	24 16	7 3 7
3	6 cwt. Superphosphate do.,	24 4	6 14 1	25 2	7 2 9

Varying Quantities of Basic Slag.

Plot	Manures applied.	1910.		Average for 2 years, 1908-9.	
		Total Yield per Statute Acre.	Value of crop after deducting cost of Manures.	Total Yield per Statute Acre.	Value of crop after deducting cost of Manures.
		T. C.	£ s. d.	T. C.	£ s. d.
4	4 cwt. Basic Slag with Dung.	22 7	6 5 10	23 17	6 18 7
5	5 cwt. Basic Slag do.,	23 0	6 7 9	24 1	6 18 5
6	6 cwt. Basic Slag do.,	24 3	6 13 8	24 14	6 19 9

III.—Artificial used Alone.

Varying Quantities of Superphosphate.

Plot	Manures applied.	1910.		Average for 2 years, 1908-9.	
		Total Yield per Statute Acre.	Value of crop after deducting cost of Manures.	Total Yield per Statute Acre.	Value of crop after deducting cost of Manures.
		T. C.	£ s. d.	T. C.	£ s. d.
1	4 cwt. Superphosphate with Sulphate of Ammonia and Kainit,	23 13	7 14 5	22 4	7 2 6
2	5 cwt. Superphosphate do.,	24 13	7 19 2	23 6	7 8 2
3	6 cwt. Superphosphate do.,	25 15	8 4 9	24 1	7 11 1

Varying Quantities of Basic Slag.

Plot	Manures applied.	1910.			Average for 2 years, 1908-9.		
		Total Yield per Statute Acre.	Value of crop after deducting cost of Manures.		Total Yield per Statute Acre.	Value of crop after deducting cost of Manures.	
		T. c.	£ s. d.		T. c.	£ s. d.	
4	4 cwt. Basic Slag with Sulphate of Ammonia and Kainit.	21 7	6	16 1	22 5	7	2 11
5	5 cwt. Basic Slag do..	22 3	6	19 2	23 9	7	9 5
6	6 cwt. Basic Slag do..	23 2	7	3 7	24 6	7	13 1

It will be seen from Table Ia., when varying quantities of superphosphate and basic slag respectively were applied with farmyard manure, that, after deducting the cost of the manures, the greatest difference in the value of the crops from any two plots was not more than 8s. 8d. per statute acre.

With results so nearly equal it is difficult to draw definite conclusions. It may, however, be noted that the increase in 1910 from the addition of an extra cwt. of either superphosphate or basic slag has increased the yield by from 13 cwt. to 23 cwt. per acre, which is more than sufficient to repay the cost of the manure. Also that the slight superiority shown by superphosphate over basic slag in the average results for 1908-9 has not been quite so marked during the past season.

The question as to which of these manures should be used to supplement the dung is one that must be decided according to local circumstances, but where the land is deficient in lime, or where the disease "Finger and Toe" is prevalent, basic slag should undoubtedly be applied.

Reference to the Tables IIa., giving the returns from the use of artificial manures without dung, shows that the best results have respectively been obtained from the heaviest dressing of both phosphatic manures. This confirms the experience of the two previous years.

In the past season superphosphate gave decidedly better average results than basic slag when applied with sulphate of ammonia and kainit without dung, while the average for the two preceding years is slightly in favour of basic slag.

C.—VARIETY TEST.

The object of this experiment was to test the cropping capabilities of different varieties of swedes and yellow turnips.

Experiments were carried out on nineteen farms in eleven counties. The average results for each county, together with the general average for all the counties, are shown in Table V. (pp. 296-7).

The first seven varieties in the list are swedes, and the remaining two are yellow turnips.

Of the swedes Incomparable Green Top has given the heaviest average yield. This is a variety of recent introduction, reported to possess excellent keeping qualities, and is worthy of further trial.

Best of All and Magnum Bonum are practically equal with the next highest yield. These varieties have consistently given good yields during the past four years, and may be regarded as two of the best general purpose swedes.

There is not much difference as regards yield in the other varieties tested, but Stirling Castle shows the lowest return.

Centenary has almost uniformly produced considerably heavier crops than Aberdeen Green Top turnip both in 1910 and in preceding years.

TURNIP EXPERIMENT:—MANURIAL TEST (WITHOUT FARMYARD MANURE) OLD SERIES.

TABLE II.—Showing the average returns per statute acre from each county.

County.	Nos. of Centres.	PLOT 1.		PLOT 2.		PLOT 3.		PLOT 4.		PLOT 5.					
		No Manure.	4 cwt. Super-phosphate.	4 cwt. Super-phosphate.	1 cwt. Sulphate of Ammonia.	4 cwt. Super-phosphate. 1 cwt. Sulphate of Ammonia. 3 cwt. Kainit.	4 cwt. Super-phosphate. 1½ cwt. Sulphate of Ammonia. 4½ cwt. Kainit.								
		tons.	cwt.	tons.	cwt.	tons.	cwt.	tons.	cwt.	tons.	cwt.				
Cork.	1	6	4	20	18	26	12	28	17	31	2				
Kerry.	1	0	0	20	0	21	17	21	19	23	2				
Longford.	2	6	1	19	4	20	10	24	9	26	18				
Wexford.	1	2	17	16	5	17	14	19	6	20	12				
Wicklow.	1	11	2	13	12	22	9	25	10	26	5				
Average yield per statute acre,		5	7	18	4	21	12	24	2	25	16				
Increase due to Manures.		—	—	12	17	16	5	18	15	20	9				
Value of Increase : Turnips at 8s. per ton.		£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.		
		—	—	5	2	10	6	10	0	7	10	0	8	3	7
Cost of Manures.		—	—	0	13	0	1	6	6	1	14	9	2	12	1
Estimated profit per statute acre from use of manures.		—	—	4	9	10	5	3	6	5	15	3	5	11	6

TURNIP EXPERIMENT:—MANURIAL TEST

(OLD

TABLE I.—Showing the average returns per

COUNTY.	No. of Centres.	PLOT 1.		PLOT 2.	
		No Manure.		20 tons Farm-yard Manure.	
		tons.	cwt.	tons.	cwt.
Antrim,	1	6	10	14	3
Carlow,	2	5	2	24	12
Cork,	2	10	7	26	15
Clare,	1	13	4	26	12
Kerry,	3	7	6	23	8
Londonderry,	1	5	10	25	12
Meath,	1	6	0	25	9
Queen's,	1	2	0	12	16
Wexford,	2	8	5	21	5
Wicklow,	1	11	2	21	14
Average yield per statute acre,		7	12	22	16
Increase due to Manures,		—	—	15	4
Value of Increase : Turnips at 8s. per ton,		—	—	£	s. d.
Cost of Manures,		—	—	6	1 7
Estimated profit per statute acre from use of Manures,		—	—	4	0 0
		—	—	2	1 7

WITH FARMYARD MANURE

SERIES).

statute acre from each county.

PLOT 3.		PLOT 4.		PLOT 5.		PLOT 6.		PLOT 7.	
10 tons Farm- yard Manure.		10 tons Farm- yard Manure. 4 cwt. Super- phosphate.		10 tons Farm- yard Manure. 4 cwt. Super- phosphate. 1 cwt. Sulphate of Ammonia.		10 tons Farm- yard Manure. 4 cwt. Super- phosphate. 1 cwt. Sulphate of Ammonia. 3 cwt. Kainit.		5 cwt. of same mixture of artificial as applied to Plot 6.	
tons.	cwt.	tons.	cwt.	tons.	cwt.	tons.	cwt.	tons.	cwt.
7	9	8	19	9	1	9	13	9	1
21	7	26	10	27	10	32	13	28	19
24	11	27	11	28	14	30	2	29	4
17	18	26	3	26	10	27	16	26	14
21	2	23	19	24	17	24	19	25	1
21	9	24	15	25	17	24	15	24	16
19	19	28	12	27	15	32	8	30	6
7	16	9	19	12	7	12	7	10	2
17	15	22	10	22	14	23	18	23	6
20	14	22	19	24	8	26	0	26	0
19	1	23	2	23	18	25	8	24	7
11	9	15	10	16	6	17	16	16	85
£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.	
4 11 7		6 4 0		6 10 5		7 2 5		6 14 0	
2 0 0		2 13 0		3 6 6		3 14 9		3 1 8	
2 11 7		3 11 0		3 3 11		3 7 8		3 12 4	

TURNIP EXPERIMENT:—MANURIAL

(NEW

TABLE III.—Showing the Average Returns

COUNTY.	No. of Centres.	PLOT 1.		PLOT 2.	
		No Manure.		10 tons Farm-yard Manure 4 cwt. Super-phosphate	
		tons.	cwt.	tons.	cwt.
Antrim,	2	17	15	19	11
Armagh,	2	15	0	21	0
Carlow,	1	20	14	26	0
Cavan,	1	11	10	23	12
Cork,	4	24	0	28	9
Clare,	1	19	15	23	10
Down,	1	22	19	27	18
Dublin,	1	16	17	18	0
Fermanagh,	1	20	14	23	12
Kerry,	2	21	16	24	11
Kildare,	3	17	14	18	16
King's,	1	13	5	12	17
Leitrim,	1	17	6	19	0
Louth,	1	16	10	20	2
Meath,	2	25	11	28	15
Monaghan,	2	12	5	17	15
Queen's,	2	10	3	13	6
Roscommon,	1	25	8	29	1
Tipperary N.,	2	12	1	20	14
Tipperary S.,	2	20	8	22	12
Tyrone,	2	19	3	24	4
Westmeath,	2	19	13	21	4
Wexford,	2	14	9	20	0
Wicklow,	2	18	19	26	4
Average yield per statute acre,		18	5	22	6
Value of crop : Turnips at 8s. per ton.,		£ s. d. 7 6 0		£ s. d. 8 18 5	
Cost of Manures,		—		2 13 0	
Value of crop after deducting cost of Manures,		—		6 5 5	

TEST WITH FARMYARD MANURE.

SERIES).

per Statute Acre from each County.

PLOT 3.		PLOT 4.		PLOT 5.		PLOT 6.		PLOT 7.	
10 tons Farm- yard Manure. 5 cwt. Super- phosphate.		10 tons Farm- yard Manure. 6 cwt. Super- phosphate.		10 tons Farm- yard Manure. 4 cwt. Slag.		10 tons Farm- yard Manure. 5 cwt. Slag.		10 tons Farm- yard Manure. 6 cwt. Slag.	
tons.	cwt.	tons.	cwt.	tons.	cwt.	tons.	cwt.	tons.	cwt.
20	3	21	16	19	3	19	12	20	14
23	9	22	12	22	17	21	15	24	0
28	10	29	12	27	4	29	6	27	14
23	0	22	12	22	19	24	6	26	4
29	19	30	16	26	11	28	1	30	12
23	18	25	14	21	3	22	12	24	6
25	17	28	0	26	17	26	9	28	3
19	7	22	11	24	1	23	17	25	5
25	10	23	15	25	0	24	18	24	15
24	4	26	13	23	2	24	14	25	15
20	19	20	11	19	18	19	5	20	19
11	3	14	2	16	1	19	5	20	2
19	17	20	11	20	11	20	19	21	2
22	0	22	7	23	2	22	8	23	12
27	17	29	9	26	11	27	5	28	0
18	2	18	12	18	12	16	10	16	0
15	1	16	4	13	11	15	7	17	12
29	12	30	2	28	13	28	18	29	11
22	8	23	7	21	3	22	4	23	4
23	9	24	8	21	18	23	4	23	10
24	7	27	8	20	11	21	8	22	19
22	3	23	15	23	4	24	11	25	5
20	13	22	3	19	19	20	11	20	19
26	19	27	7	26	19	27	15	28	9
23	3	24	4	22	7	23	0	24	3
£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.	
9 5 2		9 13 7		8 18 10		9 4 0		9 13 2	
2 16 3		2 19 6		2 13 0		2 16 3		2 19 6	
6 8 11		6 14 1		6 5 10		6 7 9		6 13 8	

TURNIP EXPERIMENT.—MANURIAL

(NEW

TABLE IV.—Showing the Average Returns

COUNTY.	No. of Centres.	PLOT 1. 4 cwt. Super-phosphate. 1 cwt. Sulphate of Ammonia. 3 cwt. Kainit.	
		tons.	cwt.
Antrim.	3	21	11
Carlow.	2	22	6
Donegal,	2	10	12
Galway.	2	21	12
Kildare,	1	17	14
King's.	1	20	6
Mayo.	2	21	14
Meath,	2	25	18
Roscommon.	2	20	2
Tipperary N.,	2	24	14
Tyrone.	2	22	17
Waterford.	1	33	9
Wicklow,	2	23	0
Average yield per statute acre,		23	13
Value of Crop : Turnips at 8s. per ton,		£	s. d.
		9	9 2
Cost of Manures,		1	14 9
Estimated profit per statute acre, after deducting cost of Manures,		7	14 5

TEST WITHOUT FARMYARD MANURE.

SERIES).

per Statute Acre from each County.

PLOT 2.		PLOT 3.		PLOT 4.		PLOT 5.		PLOT 6.	
5 cwt. Super-phosphate. 1 cwt. Sulphate of Ammonia. 3 cwt. Kainit.		6 cwt. Super-phosphate. 1 cwt. Sulphate of Ammonia. 3 cwt. Kainit.		4 cwt. Slag. 1 cwt. Sulphate of Ammonia. 3 cwt. Kainit.		5 cwt. Slag. 1 cwt. Sulphate of Ammonia. 3 cwt. Kainit.		6 cwt. Slag. 1 cwt. Sulphate of Ammonia. 3 cwt. Kainit.	
tons.	cwt.	tons.	cwt.	tons.	cwt.	tons.	cwt.	tons.	cwt.
22	9	24	10	21	0	21	9	23	0
24	6	24	11	21	12	21	3	21	8
20	19	21	14	18	15	20	18	21	1
23	3	23	6	21	13	23	7	24	1
17	15	17	2	16	0	15	0	15	15
20	6	22	4	12	14	13	17	14	17
30	12	32	17	26	11	29	10	30	11
27	17	29	6	25	10	27	0	28	10
26	14	25	19	26	8	26	19	26	5
25	3	25	19	22	6	23	11	24	12
24	10	24	8	23	1	23	4	25	1
32	9	34	0	30	6	29	4	30	6
23	13	27	13	22	8	23	10	25	15
24	13	25	15	21	7	22	3	23	2
£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.	
9 17 2		10 6 0		8 10 10		8 17 2		9 4 10	
1 18 0		2 1 3		1 14 9		1 18 0		2 1 3	
7 19 2		8 4 9		6 16 1		6 19 2		7 3 7	

TURNIP EXPERIMENT.—

(NEW

TABLE V.—Showing the Average Returns

COUNTY.	No. of Centres.	Stirling Castle.		Improved Purple Top.		Elephant.	
		tons.	cwt.	tons.	cwt.	tons.	cwt.
Antrim,	1	20	14	20	4	18	6
Down,	2	19	19	23	13	24	3
Fermanagh,	1	19	14	21	2	18	17
Kerry,	2	22	17	23	8	23	19
Kildare,	1	19	15	22	8	19	7
Longford,	1	16	0	20	9	18	0
Louth,	3	26	10	28	15	27	13
Roscommon,	2	28	16	29	12	29	4
Tipperary N.,	2	19	10	21	9	19	16
Waterford,	1	22	0	28	4	23	17
Wexford,	3	17	7	18	0	16	11
Average yield per statute acre,	—	21	4	23	13	22	9

VARIETY TEST.

SERIES).

per Statute Acre from each County.

Best of All.	Magnum Bonum.	Triumph.	Incom- parable Green Top.	Aberdeen Green Trop	Centenary.
tons. cwt.	tons. cwt.	tons. cwt.	tons. cwt.	tons. cwt.	tons. cwt.
21 17	16 18	20 4	16 13	16 18	22 7
24 8	27 6	20 5	25 17	24 19	29 5
20 17	20 11	20 17	22 19	24 0	26 6
24 9	25 0	27 4	26 19	23 10	30 4
21 6	18 15	20 12	21 18	21 16	21 7
20 5	18 10	19 0	18 10	16 0	20 0
30 8	28 1	28 6	31 19	31 6	31 16
35 7	36 11	27 19	30 18	35 13	40 10
22 14	25 3	24 9	23 12	26 5	36 1
28 0	26 0	21 2	24 0	23 10	33 11
17 8	18 1	17 10	20 16	21 5	27 8
24 14	24 12	23 2	25 2	25 6	30 3

VII.—WHEAT.

The experiments in Wheat cultivation carried out during the past season consisted of the two following series:—

SERIES I.—LARGE SCALE EXPERIMENTS.

The varieties tested in this series were Red Chaff White, Red Fife, White Queen, and White Stand Up. Each plot was two acres in extent, and the centres were situated as follows:—Two in County Dublin, and one each in Counties Carlow, Cork and Kildare. The produce of the plots from one centre was submitted to milling tests, which were carried out by a member of the Irish Millers' Association.

SERIES II.—SMALL SCALE EXPERIMENTS.

These were conducted by the respective Agricultural Instructors in the following counties:—Carlow, Cork, Down, Mayo, Meath, Roscommon, Tyrone, Waterford, Westmeath, and at the Agricultural Station, Athenry. The varieties tested at each centre were the same as in Series I.

The size of the plots varied from one-eighth to one-quarter of an acre.

SERIES I.—The following Table shows in each Centre the name of the Experimenters, the character of the soil and sub-soil, and its previous treatment.

Centre.	Experimenter.	Character of Soil and Subsoil.	Previous treatment of Land.
Co. Carlow, Bagenalstown.	T. Tennant, Oldtown.	Good deep Loam. Subsoil, Limestone Gravel.	1908. Oats. 1909. Roots, with Farmyard Manure.
Co. Cork. Midleton.	D. Kelleher, Clashduff.	Good Loam. Subsoil, Yellow Clay and Gravel.	1908. Oats. 1909. Roots, with Farmyard Manure.
Co. Dublin, Clondalkin,	J. J. Lawlor, Irishtown.	Strong Loam. Subsoil, Yellow Clay.	1908. Oats. 1909. Roots, with Farmyard Manure and artificials.
Glasnevin.	Albert Agricultural College.	Strong Loam. Subsoil, Yellow Clay.	1908. Oats. 1909. Roots, with Farmyard Manure and artificials.
Co. Kildare,	R. K. Wright, Kilkea.	Deep Loam. Subsoil, Yellow Clay and Gravel.	1908. Oats. 1909. Roots, with Farmyard Manure and artificials.

SERIES I.—Table showing the Returns per Statute Acre
from each Centre.

Centre.	White Stand Up.	White Queen.	Red Chaff White	Red Fife.
	cwt. qrs.	cwt. qrs.	cwt. qrs.	cwt. qrs.
Co. CARLOW.				
T. Tennant, . Good Corn, .	29 1	24 0	23 1	17 2
Bagenalstown.				
Screenings,	1 0	0 2½	1 3	1 2½
Total, .	30 1	24 2½	25 0	19 0½
Co. CORK.				
D. Kelleher, . Good Corn, .	22 3½	19 3	27 3	16 3
Midleton.				
Screenings,	0 0½	0 1	0 1½	0 1
Total, .	23 0	20 0	28 0½	17 0
Co. DUBLIN.				
J. J. Lawlor, . Good Corn, .			21 3½	16 1
Clondalkin,				
Screenings,			1 3½	4 2
Total, .			23 3	20 3
Albert Agricultural College, . Good Corn, .	31 0½	28 1	30 0	25 0
Glasnevin,				
Screenings,	2 0	2 0	1 2½	1 3
Total, .	33 0½	30 1	31 2½	26 3
Co. KILDARE.				
R. K. Wright, Good Corn, .	22 0	19 1½	21 0½	19 1½
Kilkea,				
Screenings,	0 2	0 3	1 0	1 0
Total, .	22 2	20 0½	22 0½	20 1½
Average Yield of Good Corn	26 1	22 3	25 2	19 2½
Average Total Yield,	27 1	23 3	26 3	20 3
Percentage of Screenings, .	3.3	3.8	4.4	5.5
Average Yield of Good Corn in barrels of 20 stones, .	brls. stns. 10 10	brls. stns. 9 2	brls. stns. 10 2	brls. stns. 7 17
Do., do. do. 1908	10 18	9 18	—	7 15
Do., do. do. 1909	9 14	9 7	—	7 16

* These returns are not included in the averages.

SERIES II.—SMALL SCALE EXPERIMENTS.—Table showing the Returns per Statute Acre from each Centre.

Name and Address of Farmer	County.	Character of Soil.	White Stand Up.		White Queen.		Red Chaff White.		Red Fife.	
			Grain.	Straw	Grain.	Straw	Grain.	Straw	Grain.	Straw
			cwt. qr.	cwt.	cwt. qr.	cwt.	cwt. qr.	cwt.	cwt. qr.	cwt.
Agricultural Station, Athenry,	Galway,	—	26 3	70	26 2	73	25 1	72	18 2	63
John Mahon, Ardnehue,	Carlow,	Good loam,	24 2	40	23 1	41	20 1	45	17 3	38
C. O'Callaghan, Glantane,	Cork,	Loam,	20 1	39	18 2	42	17 2	33	14 3	31
J. O'Donohue, Mill-street,	do.,	Light loam,	18 3	38	19 3	44	18 1	41	15 1	30
E. Gould, Macroom,	do.,	Brownstone loam,	25 3	33	20 0	35	24 0	38	23 0	34
D. O'Callaghan, Donoughmore,	do.,	Clay,	22 2	36	22 2	41	20 0	40	21 1	33
H. Twomey, Ballinlough,	do.,	Light loam,	23 2	27	23 0	28	21 2	36	20 3	28
J. O'Sullivan, Berrington,	do.,	Clay,	19 1	35	17 2	37	17 3	41	17 1	36
J. Aird, Bangor,	Down,	Clay loam,	26 2	39	22 0	33	21 1	34	16 0	28
F. Casey, Ballinrobe,	Mayo,	L'stone clay,	27 0	28	23 1	30	23 0	34	13 0	20
J. Flynn, Enfield,	Meath,	Light loam,	21 3	30	24 0	42	21 2	33	16 1	35
*J. Brennan, Boyle,	Roscommon,	L'stone clay,	22 1	—	21 3	—	19 1	—	17 2	—
*P. Connolly, Rathconor,	do.,	do.,	21 3	—	22 2	—	20 3	—	17 0	—
P. Cunningham, Omagh,	Tyrone,	Clay loam,	20 3	36	16 0	34	18 2	38	11 3	26
P. Sheridan, Kilrush,	Waterford,	Loam,	30 0	54	20 2	61	25 0	62	24 0	58
J. Hodgins, Kilbeggan,	Westmeath,	do.,	30 2	40	24 0	40	22 1	38	19 0	37
Average yield per Statute Acre.			24 0	40	22 0	41	21 0	42	17 3	35
Average yield per Statute Acre in barrels of 20 stones			9 12	—	8 16	—	8 8	—	7 2	—
Do.	do.,	do., 1908,	10 2	—	9 4	—	—	—	6 9	—
Do.	do.,	do., 1909,	9 14	—	9 2	—	—	—	7 2	—

* These returns are not included in the averages.

REMARKS.

The past season must be regarded as an unfavourable one for the wheat crop. The autumn of 1909 was persistently wet, and the land up to the end of that year never became sufficiently dry to allow of wheat being sown even in the highest lying districts.

The unfavourable conditions prevailing during the concluding months of 1909 were continued into the spring of the following year, and wheat sowing generally was too late to obtain the best

results. In addition to late sowing the summer was particularly wet and sunless—circumstances that accentuated the already late-ripening tendency of the crop. A large proportion of wheat was never thoroughly ripened, and the bad harvest weather in which the crop was gathered did not improve its condition.

The field trials in 1908 and 1909 included Square Head Master amongst the four varieties tested. The value of this wheat as a prolific cropper was well demonstrated at all centres in both years, but it has unfortunately not maintained anything approaching a premier position in value as a milling variety. In 1910 it was replaced in the trials by Red Chaff White.

The results obtained this year are similar to those of 1908 and 1909. White Stand Up has produced the heaviest yield, and the relative position of White Queen and Red Fife remains the same. Sufficient figures are not yet available for Red Chaff White, but the appearance of the crop when growing and the quality of the grain produced indicate that it may possibly prove a reliable wheat for general cultivation.

The relative value per barrel of the four varieties tested in 1910 may, on the average of last autumn's prices, be stated as follows:—

White Stand Up	..	...	16s. to 18s. per barrel.
White Queen	.	..	16s. to 18s. ..
Red Chaff White	.	...	17s. to 18s. ..
Red Fife	...	.	18s. to 20s. ..

Milling and baking tests were carried out to ascertain the quality of the wheat produced on the larger plots in 1909. Red Fife again gave the highest quantity of first-class flour, and in the bakehouse produced loaves of high quality. White Queen and White Stand Up came next in order, but were greatly inferior to Red Fife in the baking value of flour. Square Head Master produced very inferior flour.

In addition to the experiments detailed above, the Department are raising pure cultures of the most desirable varieties from single ears. It is anticipated that there will be sufficient seed available to sow the experimental plots in 1912, and at the end of that year small quantities will, it is hoped, also be available for general distribution to seed growers.

MANURING.

When sown after roots, it is not necessary to use any artificial manure with wheat, except in the event of the plants tillering badly, or of a severe wireworm attack, when 1 cwt. of nitrate of soda per statute acre may be profitably applied. If wheat is sown after another corn crop, a dressing of from 2 to 3 cwt. superphosphate, and, if the land is light, 2 to 3 cwt. kainit per statute acre might be

applied at the time of sowing the seed. This should be supplemented in spring with about 1 cwt. nitrate of soda per statute acre.

DRESSING OF WHEAT SEED FOR THE PREVENTION OF SMUT.

The presence of smut in a crop of wheat not only involves a loss to the farmer in yield, but has a detrimental effect on the quality of the produce. It is therefore extremely desirable to adopt some precautionary methods for the prevention of smut. One of the simplest of these is to dress the seed before sowing with copper sulphate solution in the following manner:—Dissolve $\frac{1}{2}$ lb. of copper sulphate in 1 gallon of water, which quantity of solution is sufficient to dress 20 stones of wheat. The corn should be spread out on a clean loft floor, and the solution may then be carefully sprinkled over it, and the whole repeatedly turned until each grain receives a coating of liquid. When this is done the wheat should be spread out in a thin layer and left to dry. If necessary it may be turned again. The operation should be carried out just immediately previous to sowing, and under no consideration should an attempt be made to sow the wheat before it is absolutely dry.

Copies of these Reports in leaflet form (Nos. 36 to 41 and 61) may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin. Letters of application so addressed need not be stamped.

PIG-FEEDING EXPERIMENTS,

AT CLONAKILTY AGRICULTURAL STATION, 1909-10.

The pig-feeding experiments conducted at Clonakilty Agricultural Station during the summer months of 1907-08 (a report of which appeared in the Department's JOURNAL, Vol. IX., No. 3) were repeated in 1909 and in 1910. An additional lot was included where half of the meal was supplied in the form of cocoa-nut meal. This is a meal used very extensively in some parts of Ireland for pig-feeding.

In 1909 it was suggested to the Department that soya-cake, a food which had been put on the market a short time previously, should be tested to ascertain if it were a suitable food for pigs. This was done, but the result was so unfavourable that it was not considered necessary to repeat the test in the following year.

The principal objects of the experiment were:—

1st. To ascertain the value of separated milk for pig-feeding, and to determine how far the price of pork may fall before it fails to return 1d. per gallon for the separated milk.

2nd. To compare the relative values of meal and potatoes for pig-feeding.

3rd. To ascertain if cocoa-nut meal is an economical food for the production of pork.

In both years (1909-10) 16 home-bred bonhams of similar quality and breeding were divided into 4 lots of 4 bonhams in each.

The total number of pigs under experiment was, therefore, 32, divided into 4 lots of 8 in each.

The food supplied was as follows:—

Lot 1.

- 1 part by weight of meal.
- 4 parts by weight of potatoes.
- 6 parts by weight of separated milk.

Lot 2.

- 2 parts by weight of meal.
- 6 parts by weight of separated milk.

Lot 3.

- 2 parts by weight of meal.
- 4 parts by weight of potatoes.

Lot 4.

- $\frac{1}{2}$ part by weight of meal.
- $\frac{1}{2}$ part by weight of cocoa-nut meal.
- $\frac{1}{4}$ parts by weight of potatoes.
- 6 parts by weight of separated milk.

The meal mixture consisted of equal parts maize meal, barley meal, and pollard. Each lot was allowed as much food as it would eat.

As in the previous experiment, it was assumed, and the assumption is based on well-known Danish experiments, that 4 lb. potatoes or 6 lb. separated milk (hereafter called "meal equivalent") are each equal to 1 lb. of meal.

Table I. shows the live-weight of the pigs when the experiment was started; the live-weight when sold; the total increase; number of days fed; average daily gain; the dead-weight; and the percentage of dead to live-weight (unfasted).

TABLE I.

Lot	Weight (unfasted) when experiment started	Weight when sold (unfasted)	Total increase	Time fed	Average daily gain	Dead weight	Ratio of dead to live weight (unfasted)
	Cwt. qr. lb.	Cwt. qr. lb.	Cwt. qr. lb.	Days.	lb.	Cwt. qr. lb.	
1.	5 1 0	16 2 7	11 1 7	93 $\frac{1}{2}$	1.70	11 3 19	72.00
2.	5 0 20	16 1 8	11 0 16	91 $\frac{1}{2}$	1.70	12 0 1	73.58
3.	5 0 0	15 1 8	10 1 8	116 $\frac{1}{2}$	1.23	11 0 19	72.90
4.	5 0 17	16 0 4	10 3 15	102	1.50	11 1 27	71.66

Lots 1 and 2 took nearly the same time (about three months) to feed. The increase and daily average gain were practically the same. On the other hand, lot 3 took 24 days' longer to feed, notwithstanding that, when sold, they still wanted about 1 cwt. live-weight to make the same increase as the others. Their daily average gain was also $\frac{1}{2}$ lb. less. Lot. 2 (meal and milk) had fully the highest ratio of dead to live-weight.

Table II. shows the total quantity of food consumed; quantity of food calculated to its equivalent in meal; and number of meal equivalents taken to produce 1 lb. live weight.

TABLE 11.

LOT	Total food consumed	Total food in meal equivalents	Meal equivalents to produce 1 lb. live weight
1.	1760 lb meal 10560 „ milk 7040 „ potatoes	1760 } 1760* } 1760** }	4.17
2.	3586 lb meal 10758 „ milk	3586 } 1793 }	4.31
3.	3584 lb meal 7168 „ potatoes	3584 } 1792 }	4.65
4.	893 lb meal 893 „ cocoa-nut meal 10716 „ milk 7144 „ potatoes	893 } 893 } 1786 } 1786 }	4.39

* One-sixth of milk.

** One-fourth of potatoes.

In other words, to produce 100 lb. live weight lot 1. took 417, lot 2 took 431, lot 3 took 465, lot 4 took 439 meal equivalents.

The price that can be realised at any time for separated milk when fed to pigs depends mainly on the following considerations.—

- (1) Price realised for the pork.
- (2) Cost of the bonhams.
- (3) Cost of other food supplied along with the milk.
- (4) Thriftiness or otherwise of the pigs.

(1) The pigs were all consigned to Messrs. W. Shaw and Sons, Limerick, per their agent at Clonakilty, as soon as they were ready to kill. The average price realized for the 32 pigs was 58s. 3d. per cwt. carcase weight, after deducting killing dues, or exactly 10s. per cwt. more than in the previous experiment.

(2) The bonhams were all charged at the same rate per cwt. as was paid for pigs of similar weights in Clonakilty fair at the dates when the experiment started. The price in 1909 was 37s., in 1910 45s. 8d., average 41s. 4d. per cwt.

(3) The average cost of the mixed meal was £6 17s. 6d. per ton. The barley was home-grown, and is estimated at 7s. per cwt. Potatoes are charged at £2 per ton. Exception might be taken to this price, as a large quantity of the potatoes used for pig-feeding were refuse, the market price of which would be about £1 per ton. On the other hand, a very large area of potatoes is grown in Ireland for pig-feeding, and are used for this purpose irrespective of their selling value.

(4) The pigs were all thrifty. At the same time lots 1 and 2 took nearly $\frac{1}{2}$ lb. more meal equivalent to produce 1 lb. live weight than they did in the previous experiment.

The charges for attendance were taken at the actual cost. It varied in the different lots according to the length of time the pigs were fed. Where the same facilities for feeding do not exist as at Clonakilty the charges might be considerably higher. However, this is an item that does not affect the main issue very materially. Even if it were doubled the cost of production would be increased only by about 1s. per cwt. Moreover, it is often entirely ignored by the feeder. As there were no potatoes to boil for lot 2 the charge for coal is less than for the other three lots. The value of manure is set against straw for litter and rent of houses.

Table III. shows income and expenditure in the case of each lot.

TABLE III.

Lot 1.

Expenditure.				Income.			
		£	s. d.			£	s. d.
8 Bonhams.	C. qr. 5 1 @ 41/4			Pork	C. q. lb. 11 3 19 @ 58/3	34	14 4
per cwt.		10	17 0				
Meal	C. q. lb. 15 2 24 @ 6/10½	5	8 0				
Milk	1033 galls. @ 1d.	4	6 1				
Potatoes	T. c. q. lb. 3 2 3 14						
@ £2		6	5 9				
Attendance		0	13 3				
Coal		0	10 0				
Carting pigs		0	4 0				
Interest on capital		0	4 0				
Profit		6	6 3				
		34	14 4			34	14 4

Lot 2.

Expenditure.				Income.			
		£	s. d.			£	s. d.
8 Bonhams.	C. qr. lb. 5 0 20 @ 41/4	10	14 1	Pork	C. q. lb. 12 0 1 @ 58/3	34	19 6
Meal	T. c. q. lb. 1 12 0 2 @ 6/10½	11	0 2				
per cwt.							
Milk	1043 galls. @ 1d.	4	6 11				
Attendance		0	13 0				
Coal		0	4 0				
Carting pigs		0	4 0				
Interest on capital		0	4 0				
Profit		7	13 4				
		34	19 6			34	19 6

Lot 3.

Expenditure.

Income.

	£	s.	d.		£	s.	d.
C. qr. lb.				C. q. lb.			
8 Bonhams, 5 0 0 @ 41/4	10	6	8	Pork 11 0 19 @ 58/3 .	32	10	8
T. c. q. lb.							
Meal 1 12 0 0 @ 6/10½							
per cwt.	11	0	0				
T. c. q. lb.							
Potatoes 3 4 0 0 @ £2	6	8	0				
Attendance	0	16	9				
Coal	0	10	0				
Carting pigs to station	0	4	0				
Interest on capital . . .	0	4	0				
Profit	3	1	3				
	32	10	8		32	10	8

Lot 4.

Expenditure.

Income.

	£	s.	d.		£	s.	d.
C. qr. lb.				C. qr. lb.			
8 Bonhams 5 0 17 41/4				Pork 11 1 27 @ 58/3	33	9	4
per cwt.	10	12	11				
C. qr. lb.							
Meal 7 3 25 @ 6/10½	2	14	10				
Cocoa-nut meal, do., @							
£8 1s. 3d	3	4	3				
Milk 1040 galls. @ 1d.	4	6	8				
T. C. qr. lb.							
Potatoes 3 3 3 4 @ £2	6	7	7				
Attendance	0	14	6				
Coal	0	10	0				
Carting pigs to station	0	4	0				
Interest on capital . . .	0	4	0				
Profit	4	10	7				
	33	9	4		33	9	4

In Table III. no allowance is made for risk. This is an item that varies from almost nothing to a considerable sum. However, as it is a factor that should be taken into account when calculating cost of production, each individual can make an allowance according to the loss of pigs by death or other causes which he expects to suffer.

Table IV. shows the cost of production per cwt. both for live and dead weights. In column A the cost of bonhams and food only are taken into account; in column B the total cost of production as detailed in the table of income and expenditure is included.

TABLE IV.

Lot	A		B	
	Cost of production per cwt., bonhams and food only		Total cost of production per cwt.	
	Live weight	Dead weight	Live weight	Dead weight
1	£ s. d. 1 12 5	£ s. d. 2 5 0	£ s. d. 1 14 4	£ s. d. 2 7 8
2	1 1 0	2 3 5	1 13 6	2 5 6
3	1 16 3	2 9 8	1 18 6	2 12 9
4	1 14 0	2 7 6	1 16 1	2 10 3

Taking the afore-mentioned prices for pork, bonhams, meal, labour, etc., the answers to the different problems for which the experiment was designed appear to be as follows:—

1st. Separated milk fed to pigs along with meal in the proportion of 1 lb. of meal to 3 lb. of milk gave a return of 2.76d., or practically 2½d. per gallon, when pork was sold at 58s. 3d. per cwt. As the object of the experiment in this case was to ascertain the return for separated milk when fed to pigs, the whole of the profit or loss, as the case might be, is set against the milk. To return 1d. per gallon for the separated milk pork must not fall below 45s. 6d. per cwt. An increase of 7s. 2d. per cwt. in the price of pork was equal to 1d. per gallon for the milk. In the Danish experiments already referred to 6 lb. of separated milk were found to be equivalent to 1 lb. of meal; in these experiments 4.45 lb. of milk, or a little less than 2 quarts, were equal to 1 lb. of mixed meal.

2nd. On a comparison of Tables II. and IV. it will be noticed that although lot 1 had a slightly lower meal equivalent than lot 2, the cost of production was 2s. 2d. per cwt. higher. This is accounted for by the fact that the price charged for the potatoes in the tables of income and expenditure is relatively too high, compared with the price of meal. At the price the meal cost, namely, £6 17s. 6d. per ton, the relative value of potatoes when fed along with meal and milk, and the extra cost of cooking is taken into account, was £1 11s. 4d. per ton. If we substitute this price for the £2 charged for the potatoes in lot 1 the profit of the two lots is the same.

In the Danish experiments 1 lb. of meal was found to be equivalent to 4 lb. of potatoes. In this case it was slightly less. Taking everything into consideration it appears that the value of potatoes for pig-feeding is not more than one quarter the price of the meal mixture used. No doubt there are districts remote from railway stations where no market exists for potatoes. On the other hand,

the loss entailed by feeding saleable potatoes to pigs, when they could command a price out of all proportion to their feeding value, must be considerable. This matter should be looked upon from a purely financial point of view. The main question to consider is, will it give a better return to sell the potatoes grown on the farm and purchase feeding stuffs?

There is a prevalent opinion in some parts of the country that pigs cannot be fed successfully without potatoes. Of the five separate experiments conducted at Clonakilty during the last four years, in every individual case whatever slight advantage there was between lots 1 and 2 it was in favour of the lot that got meal and milk only. Had no milk been used, it is quite possible the results might have been different. At the price that has ruled for pork for the last three or four years feeding to pigs has been a most profitable method for the disposal of refuse potatoes, more especially when fed along with a small quantity of milk; but where a market exists for saleable potatoes it is very questionable if they should be fed to pigs when they command more than one-quarter the price of meal.

3rd. The cocoa-nut meal does not appear to warrant the extra price of £1 3s. 9d. per ton paid for it. Compared with lot 1, where the only difference is that one-half of the ordinary meal mixture was replaced with cocoa-nut meal, the profit on the eight pigs was £1 15s. 8d., or 4s. 5d. per head less. When fed in the proportions used in the experiment it does not appear to be even of equal value weight for weight to the mixed meal. If we charge it at the price of the meal mixture there would still be a total loss of £1 6s. 3d. on the eight pigs. This is accounted for by the fact that the pigs consumed more food to make the same increase as lot 1. Had the cocoa-nut meal been used in smaller proportions the results might have been different. As far as this experiment goes, cocoa-nut meal does not appear to be worth the extra price paid for it over and above the price of the ordinary meals generally used for pig-feeding.

The following are the principal differences between this and the experiment referred to in the opening paragraph of this article:—

1st. The cost of production for lot 1 was 6s. 1d., and for lot 2 5s. 2d. per cwt. carcase weight higher. This is due to the 5s. per ton extra paid for the meal; the 4s. 5d. per cwt. extra on the first cost of the bonhams; and the half-pound extra meal equivalent required to produce 1 lb. live weight. However, this is more than compensated for in the extra 10s. per cwt. received for the pork.

2nd. The cost of production for lot 3 was 2s. per cwt. less. This was partly due to the fact that one of the pigs in this lot in the previous experiment did badly, and the meal equivalent to produce 1 lb. live weight was $\frac{1}{4}$ lb. lower on this occasion.

Owing to the higher price realized for the pork this lot left a profit instead of a loss, as was the case in the first experiment. At the

same price, namely, 48s. 3d. per cwt., there would have been a loss of 4s. 6d. per cwt. carcase weight.

Although the difference between the lots that received a supply of separated milk and the lot that did not is much less than in the previous experiment, still, the difference of 7s. 3d. per cwt. carcase weight in the cost of production shows the importance of milk in the economic production of pork and might often mean the difference between a profit or a loss. In other respects the experiment corroborates the former one. The relative value of meal and potatoes, and the rise or fall in the price of pork that is equal to 1d. per gallon on the separated milk, are practically the same.

At the price pork has commanded for the last two or three years, separated milk, when fed to pigs, has given a much better return than the price generally put on it, namely, 1d. per gallon.

J. L. DUNCAN.

THE POTATO CROP.

THE DECLINE OF THE CHAMPION.

Of late years many complaints have been received concerning the deterioration of the Champion potato. In favourable years the matter has aroused little comment, but in a season such as that which has just closed, when the conditions have been adverse to the production of really good crops of any variety of potato, the opinion is expressed on every side that reliance can no longer be placed in the Champion.

It is very generally believed that the Champion has deteriorated, that at the present time it does not produce such uniformly satisfactory crops as formerly, and, further, that it is now more subject to blight than in the years following its introduction. These remarks do not apply to the Champion alone, as all varieties of cultivated potatoes are believed to deteriorate.

It is not proposed here to discuss the reasons for the decline in the vigour and productiveness of varieties of potatoes except in so far as to suggest some of the more common practices which contribute to this deterioration, and which it is possible for the majority of farmers to change. It is rather the intention of the Department to suggest varieties which might be tried as a substitute for the Champion.

It may be noted that the percentage of the total area of potatoes planted with Champion has steadily declined from 65.1 per cent. in 1900 to 52.6 per cent. in 1909, while the proportion of the total area planted with Up-to-date has increased during the same period from 1.1 per cent. to 16.8 per cent. This change has not been confined to any one county or province, but it applies to the country generally. It is safe to assume, therefore, that it has occurred as the result of experience in the field, and the Department do not hesitate to express the opinion that this substitution of Up-to-date for Champion has been a wise modification of the farming practice of this country.

CHOICE OF VARIETIES.

The Department, indeed, would suggest to farmers that it is desirable still further to reduce the area planted with Champion and to grow other varieties instead. The question then naturally arises as to what kinds are suitable for this purpose.

It has been shown that Up-to-date has steadily increased in favour during the past ten years, and it will probably

Up-to-date. be grown even more extensively in the future.

In referring to Up-to-date it should be observed that this name is intended to cover the varieties of the Up-to-date

type, such as Scottish Triumph, Factor, Duchess of Cornwall, and many others. These potatoes are so similar that it is practically impossible to distinguish between them. As compared with Champion, they produce considerably heavier crops, and the tubers are less liable to disease, but when boiled they are softer in texture and inferior in flavour. The Department, however, are of the opinion that farmers should plant at least a portion of the land available for potatoes with a variety of the Up-to-date type.

During the past two seasons the Department have carried out a large number of tests with the Irish Queen potato
Irish Queen. under widely varying conditions in the West of Ireland. They have also received reports regarding this potato from many other parts of the country. The information thus collected shows this variety to be possessed of qualities which justify the Department in recommending its cultivation on a more extended scale, particularly in those districts where the Champion hitherto has been grown to the exclusion of almost every other kind. Irish Queen produces average crops with fewer small potatoes than the Champion; it resists disease better, and, what is of supreme importance, the tubers are of good cooking quality.

This variety should not be manured too liberally, and the sets should be planted not more than ten inches apart.

In some of the Northern counties the Black Skerry potato is now grown in considerable quantities. This is a potato
Black Skerry. which appears to be more suited to the conditions prevailing in the North-Eastern portion of Ulster than to those in any other part of Ireland. Still on heavy land it will produce fairly good crops in other districts, and it might be grown to a larger extent than at present. The best features of this potato are its resistance of disease, and more especially the excellent cooking quality of the tubers.

It is not suggested that these are the only kinds which it would be profitable to substitute for the Champion, but, having regard to cropping powers, disease resisting capacity, and cooking quality, they are amongst the best of the late varieties which have been tested.

For digging in summer, before the main crop kinds have matured, British Queen is strongly recommended. This
British Queen. potato is a prolific cropper, and the tubers are excellent for table use. The chief drawback to the cultivation of British Queen is that it is very subject to disease. This variety might be substituted for Flounder with great advantage.

SELECTION AND TREATMENT OF SEED.

Reference has already been made to certain practices which tend to accentuate deterioration in potatoes; these chiefly concern the selection and treatment of the seed tubers.

It is not generally realised that planting very small tubers year after year is an important factor in reducing the **Size of Seed.** vigour of potatoes, and that unless strong, healthy, vigorous plants are produced small yields must follow. The continuous selection of small seed is wrong, but when small tubers are not planted whole, but are cut into two, or even more, sets, as is not unusual, the evils of the system are greatly intensified. With such methods, no variety of potato would produce profitable crops.

As a general rule tubers should be planted whole, and the seed should not be smaller in size than a hen's egg. Larger sized seed usually produces heavier crops, but the increase is not sufficient to compensate for the extra quantity of seed used. It will be found that with seed of the size indicated, planted twelve inches apart, in drills twenty-seven inches wide, from 18 to 20 cwt. will be required to plant one statute acre. To attempt to economise in this direction is short-sighted policy.

There are circumstances in which it is advisable to cut seed, indeed excellent results may be obtained by **Cut Sets.** cutting large tubers, provided not more than three sets are taken from one tuber. Such sets will produce crops equal to those obtained from medium-sized tubers planted whole, and from the cut sets there will be a larger proportion of saleable potatoes.

The sprouting of seed in boxes before planting effects a considerable increase in the crop yield. The system is fully **Sprouting.** explained in the Department's leaflet, No. 58, which should be read by every farmer in Ireland.

The advantages derived from a change of seed require to be emphasised. Seed potatoes deteriorate when **Change of Seed.** grown in the same class of land on the same farm, no matter how much attention may be paid to the selection of the seed from year to year. It is not always necessary to procure seed from another district, as there may be sufficient diversity in the class of soil in one district, or even on one farm, to obviate the expense attendant upon the introduction of new seed from a distance.

It is desirable that only tubers which are sound and free from disease should be used for planting. All diseased, **Soundness and** and also malformed, tubers should be rejected.

Purity of Seed. Farmers should take steps to ensure that the variety grown is true to type and free from admixture of other kinds. Such impurities or "rogues" may be detected amongst the seed by shape, colour of skin, colour of flesh, or by the colour of the sprout, while later they may be identified in the growing crop by a difference in the colour of the blossom, character of the foliage or date of ripening, but at whatever stage they are observed they should be removed.

TESTS WITH FOUR NITROGENOUS MANURES.

Hitherto the main supply of nitrogen from artificial sources for farm crops has been derived from sulphate of ammonia and nitrate of soda. Recently, however, two other nitrogenous manures, viz., calcium cyanamide and nitrate of lime, have been placed on the market.

With a view to comparing the relative manurial value of these four manures for different farm crops, a series of experiments has been carried out by the Department during the past two years.

In every case the cultivation of the lots was the same, and the only varying factor in the manures was the source of nitrogen. Approximately an equal quantity of nitrogen was applied to each plot, the nitrogen contained in 1 cwt. sulphate of ammonia per statute acre being taken as the standard.

The manures were applied in the ordinary way at time of sowing the seed except in the case of nitrate of soda and nitrate of lime: these were applied as a top dressing when the plants were well above ground.

The percentages of nitrogen in the manures used at most of the centres were as follows:—

Sulphate of Ammonia,	19.75
Nitrate of Soda,	15.50
Calcium Cyanamide (Nitrolim),	18.00
Nitrate of Lime,	13.00

OATS.

TABLE I.—Showing nitrogenous manure applied and average yield per statute acre from seven centres, together with average yield for similar experiments in 1909.

Nitrogenous Manure Applied.	1910		1909	
	Yield.		Yield.	
	Grain.	Straw.	Grain.	Straw
Sulphate of Ammonia,	cwt. gr. 20 2	cwt. 43	cwt. gr. 26 2	cwt. 47
Nitrate of Soda,	19 2	42	25 2	50
Calcium Cyanamide,	19 2	39	27 0	44
Nitrate of Lime,	19 3	41	27 0	48
No Nitrogenous Manure,	15 2	34	24 1	41

At every centre except one, all the plots were dressed with super-phosphate and kainit, in addition to the nitrogenous manures.

The average yield of grain from plots dressed with nitrate of soda, calcium cyanamide, and nitrate of lime is practically the same. The heaviest yield, both in respect of grain and straw, was produced by sulphate of ammonia.

As will be observed from the above table, the results obtained in the past season do not confirm those of 1909.

POTATOES.

TABLE II.—Showing nitrogenous manure applied and average yield per statute acre from ten centres, together with average yield for similar experiments in 1909.

Nitrogenous Manure Applied.	1910		1909	
	Yield.		Yield.	
	Saleable.	Total.	Saleable.	Total.
	tons cwt. 10 5	tons cwt. 11 15	tons cwt. 10 12	tons cwt. 12 6
Sulphate of Ammonia,	10 5	11 15	10 12	12 6
Nitrate of Soda,	9 14	11 7	10 8	12 2
Calcium Cyanamide,	10 3	11 13	10 16	12 15
Nitrate of Lime,	9 11	11 6	10 15	12 10
No Nitrogenous Manure,	8 13	10 3	9 12	11 10

At nine of the ten centres the crops received a dressing of super-phosphate and muriate of potash in conjunction with dung, while at the remaining centre dung only was applied.

The average results show only a slight variation in yield, but a comparison of the figures for both years shows that satisfactory returns have been obtained from calcium cyanamide.

TURNIPS.

TABLE III.—Showing nitrogenous manure applied and the average yield per statute acre from ten centres, together with average yield for similar experiments in 1909.

Nitrogenous Manure Applied.	1910	1909
	Total yield	Total yield
	tons cwt. 25 13	tons cwt. 25 3
Sulphate of Ammonia,	25 13	25 3
Nitrate of Soda,	26 10	26 6
Calcium Cyanamide,	25 16	26 3
Nitrate of Lime	25 15	24 17
No Nitrogenous Manure,	25 11	23 11

A dressing of other artificial manures was given at all ten centres, but only at five centres was farmyard manure applied.

As in 1909, the heaviest yield was obtained from the use of nitrate of soda.

MANGELS.

TABLE IV.—Showing nitrogenous manure applied and the average yield per statute acre from ten centres, together with average yield for similar experiments in 1909.

Nitrogenous Manure Applied.	1910		1909	
	Total yield		Total yield	
	tons	cwt.	tons	cwt.
Sulphate of Ammonia,	26	9	32	10
Nitrate of Soda,	27	0	31	14
Calcium Cyanamide,	25	8	30	3
Nitrate of Lime,	26	2	32	17
No Nitrogenous Manure,	22	8	25	9

Apart from the nitrogenous manures referred to in the above table, the manurial treatment of this crop varied, following in each instance the usual practice of the district. In the past season nitrate of soda produced the heaviest crop, while in 1909 the highest yield was obtained from nitrate of lime.

REMARKS.

The results of the experiments for the two years 1909-10 indicate that the two new nitrogenous manures are not inferior to the two manures which are already in general use. The 1910 results do not confirm those of the previous year, but there is not a great difference in yield with any of the crops.

Further experiments will require to be carried out before a definite opinion can be expressed with regard to the relative value of these manures.

The Department desire to point out that in addition to the actual yield from these manures, the comparative cost, that is, the unit value of the nitrogen in each case and also the suitability of the manures for mixing and the ease with which they can be handled are important factors worthy of consideration.

Nitrate of lime is usually delivered in casks; if exposed to the air it absorbs moisture and quickly becomes wet and pasty or even liquid in form. It is not, therefore, suitable for mixing with other manures. This is a serious disadvantage in the use of the manure.

Calcium cyanamide is a very fine powder, and is unpleasant to sow by hand. It should be stored in a dry place.

LIQUID MANURE.

Everyone that has given the slightest attention to the matter will admit that in all parts of the country a considerable waste takes place as regards liquid manure from byres, stalls and piggeries, as well as by drainage from the manure heap. If it were possible to get the greater portion of this applied to the land it would result in an enormous increase in crop production, and at the same time effect a great saving in the use of artificial manures.

The following table shows the equivalent quantities of artificial manures required to supply the same amount of nitrogen, phosphate and potash as is contained in one ton pure cow urine. For the purpose of comparison the amounts are also stated for one ton well rotted farmyard manure of good quality:—

TABLE.

Kind and quantity of Manure.	Nitrate of Soda required to supply an equivalent amount of nitrogen.	Superphosphate, 35 per cent. soluble phosphate required to supply an equivalent amount of phosphate.	Kainit required to supply an equivalent amount of potash.
One ton pure cow urine	1 cwt.	$\frac{1}{2}$ cwt.	1 cwt.
One ton farmyard manure	$\frac{1}{2}$ cwt.	$\frac{1}{2}$ cwt.	1 cwt.

It is, however, necessary to explain that the manurial ingredients in the urine and farmyard manure are not in the same readily available form as in the artificial manures referred to. Moreover, they are more subject to loss in storage and application; besides urine is never applied pure, but always diluted; and, therefore, too close a comparison cannot be drawn between liquid manure and artificial manures.

The drainage from the manure heap is not only rich in all the valuable manurial ingredients, viz., nitrogen, phosphate and potash, but it contains the soluble and, therefore, the most valuable part of those constituents which have been washed out of the solid manure. It is not necessary to dilate on the value of liquid manure as a fertiliser. It proclaims its own good properties in no uncertain manner where it is allowed to flow over a pasture or meadow.

There is great diversity of opinion as to how to utilise liquid manure to the best advantage. Many people question if it pays for the trouble and expense of application. A valuable experiment conducted at Clonakilty Agricultural Station (a report of which appeared in the Department's JOURNAL, Vol. X., No. 3), showed that when dilute liquid manure was applied to an old meadow it was nearly equal in value, weight for weight, with best farmyard manure made under cover from cattle receiving cake. Valuing the hay at £2 per ton, the increased yield from every ton of farmyard manure was worth 3s. 5d., and from every ton of liquid manure it was worth 3s. 2d. On the same farm this year 16 tons per acre of liquid manure applied to first crop ryegrass and clover hay gave an increase of 16 cwt. 1 qr. These are figures which suggest that the utilisation of liquid manure should receive much more attention.

Different systems in use throughout the country for dealing with liquid manure:—

1. Irrigation.—Where conditions are favourable, this is without doubt the most economical system of utilising liquid manure. Unfortunately it is only in exceptional cases that the land near a farmyard lends itself to irrigation. It is also necessary to have a sufficient quantity of water to dilute the liquid so as to ensure its distribution over a wide area. In most cases, owing to the liquid not being thoroughly distributed, all that can be seen is a small patch covered with rank herbage, and the benefits that might otherwise be obtained are practically lost.

2. Use of Peat Moss.—In some districts peat moss or bog mould taken from the bog is used in the byres or stalls, also round about the manure heap for the purpose of soaking up the liquid. This is an excellent system where fairly dry moss can be obtained at a convenient distance from the yard. Unfortunately it is often saturated with water before use, so that its absorptive power is very much diminished. The expense of carting the moss to the yard and again to the field is considerable, but most of this work is generally done when the horses would otherwise be idle. On light land the organic matter in the mould is useful for helping to preserve moisture in dry weather.

3. Sea Sand.—Along the coast sea sand is used for the same purpose and in the same manner as peat moss. The sand contains from 5 to 30 per cent. of lime, which, in the latter case, is of considerable value. Its absorptive power is less than peat, and, moreover, it is very heavy to handle. On stiff land the sand has a special mechanical value in helping to keep the soil open. As in the case of peat moss, the expense of cartage would be prohibitive were it not often done when other work for the horses is not very pressing.

4. Direct Application.—The liquid is collected in a suitable tank and conveyed direct to the field. The size of the tank must depend on the number of live stock on the farm. On very small holdings a paraffin barrel, or even half a paraffin barrel, would be sufficient for the purpose. Whatever receptacle is used it must be placed in such a position that not more water will be collected than is necessary to dilute the liquid before it is spread on the land. Perhaps the best situation on a small holding is to place the barrel outside the byre or stall door, while on a large farm the tank should be placed in a corner of the manure heap, where the soakage from the manure and all the liquid manure from the byres and piggeries can be drained into it.

Liquid manure can be applied to almost any crop, but it is specially suited for cabbages, mangels, Italian ryegrass, and meadows in general. On the smaller farms, where a barrel is the collecting medium, a small area of Italian ryegrass should be grown close to the house. During winter and early spring the liquid manure could be carried out in buckets and spread over it. In most districts the grass would be ready for soiling early in May, when green food generally is scarce. It would afford two cuttings afterwards, or could be meadowed at discretion. In spring the liquid manure could be applied with great advantage to cabbages, and later in the season to mangels.

On large farms it would be necessary to provide a cart of some description for the purpose of conveying the liquid to the fields. There are several liquid manure carts on the market, but there is no necessity to incur this expense. A barrel of 100 gallons capacity fixed on the wheels, axle and shafts of an old cart will suit the purpose admirably. Distribution can be effected by means of a V-shaped trough attached to the end of the cart. This should have perforated holes at regular intervals to allow the liquid to spread as the horse travels along. A pump on the endless-chain principle is the best system of emptying the liquid from the tank into the cart. A pump of this description would cost about £4, but the price would vary according to the length of chain required.

On medium-sized farms, where the cost of the tank, pump and cart might be considered prohibitive, a barrel with a spigot (or plug) at the bottom, standing in an ordinary cart, with the trough attachment, would suit the purpose. This would necessitate the emptying of the collecting barrel into the distributing one by means of buckets.

Liquid manure is constantly accumulating, and on this account cannot be held over for an indefinite period in the same way as farmyard manure. It is, therefore, necessary to empty the tank periodically during winter and spring. At these seasons the choice of crops to which it can be applied is limited. However, this is not

such a serious drawback as might at first appear. There is no crop that responds more freely than first crop hay, and this is available from the time the previous crop is removed in autumn until the middle of May; and, as already mentioned, a patch of Italian rye-grass that has had a liberal dressing of liquid manure will come in for cutting at a time when green food is generally at a premium. Where catch crops, such as rye and vetches, are grown applications of liquid manure would not only increase the crop, but would hasten its growth.

Apart altogether from the increased yields obtained from the use of liquid manure, there is still the more important financial aspect of the question to consider. According to the Clonakilty experiment already quoted, the results obtained from the application of liquid manure to an old meadow were nearly equal to those obtained from the same weight of the best manure produced on the farm. If the farmyard manure in this case paid for the trouble and expense bestowed on it (and few will care to say that it did not) the liquid manure also paid for the labour of collecting and distributing.

The Department are so impressed with the benefits to be derived from the application of liquid manure that they propose, with the aid of the Itinerant Instructors, to carry out a series of experiments in every county in Ireland provided a sufficient number of farmers can be found to co-operate with them, in order to bring clearly before agriculturists the advantages of using liquid manure.

PERMANENT PASTURE GRASSES.*

The selection and sowing of seeds for pasture are points which, though of great importance to the farmer, do not usually receive sufficient attention. The failure of a pasture is frequently due to the use of inferior seeds or unsuitable mixtures. There is now no excuse for the use of seeds which are impure, or of low germinating power.

Samples of seed can be tested at the Department's Seed Testing Station, which is available to all farmers in Ireland. Packages for sending seeds by post are supplied free of charge, and the fee to farmers for testing is only three pence per sample—see Leaflet No. 59.

While all the operations in connection with the laying down of land to grass are important, the most vital factor is the selection of the grasses; the choice of which will depend upon the character of the soil, the purpose for which the grass is intended, and the number of years for which it is to be laid down.

The varieties of grasses and clovers which the Department generally recommend are the following:—Perennial Ryegrass, Italian Ryegrass, Timothy, Cocksfoot, Meadow Fescue, and, under certain conditions, Meadow Foxtail; and of clovers:—Red Clover, White Clover, Alsike Clover.

Perennial Ryegrass can be grown successfully on most soils in Ireland, and is particularly suited to the better class of limestone soils.

Italian Ryegrass will grow on almost all soils, but is least satisfactory on poor dry land. It is the most suitable grass for producing heavy crops for one year. As this grass is not permanent it should not be sown in large quantities if the land is to remain in permanent pasture.

Cocksfoot, owing to its tendency to grow strong and coarse on heavy soils, should be used only in medium quantities.

Timothy succeeds best on moist black soils and strong clays.

Meadow Fescue flourishes on deep loamy soils, but may be grown with advantage on other soils. It is one of the best grasses both for hay and pasture.

Red Clover, under favourable conditions, will give a heavier yield than any of the other clovers, and it should be sown wherever it is found to grow satisfactory.

Alsike Clover does well on most soils, it will grow on peaty soils and on land where red clover cannot be cultivated successfully.

* This article is a reprint—revised and in part re-written—of the Department's Leaflet No. 42.

Under such conditions it should replace red clover to a large extent in the seed mixture.

White Clover is of far greater value in a pasture than in land under hay.

For permanent pastures, or for land that is to remain in grass for 5 or 6 years, there should be a proportion of all the grasses and clovers mentioned above. The relative quantities, however, must vary according to local conditions.

The following varieties and quantities of seeds per statute acre are suggested as the basis of a mixture for medium soils for three years or more:—

15 lb.	Perennial Ryegrass.
7 „	Italian Ryegrass.
4 „	Meadow Fescue.
3 „	Timothy.
3 „	Cocksfoot.
4 „	Broad Red Clover.
2 „	Alsike Clover.
2 „	White Clover.

Total 40 lb. per statute acre.

While some of the land in Ireland is eminently suitable for laying down to permanent pasture, there is a large proportion that is not suitable for this purpose. On many soils it is highly advantageous to break up the pasture after the second or third year.

Under such conditions the following mixture is suggested for land that is to remain in grass for two years—hay first, and pasture the second year:—

18 lb.	Perennial Ryegrass.
9 „	Italian Ryegrass.
3 „	Timothy.
3 „	Cocksfoot.
4 „	Broad Red Clover.
2 „	Alsike Clover.
1 „	White Clover.

Total 40 lb. per statute acre.

In districts where Ryegrass seed is saved, and where the land is allowed to remain in grass for a second or even a third year, 3 lb. each of Timothy and Cocksfoot might, with great advantage, be sown with the Ryegrass seed. These grasses would improve the pasture to a marked degree during the second and third years, and as they ripen later than the Ryegrasses, they would not hinder the saving of that seed.

It is still necessary to urge the discontinuance of the worst of all practices, namely, the sowing of "light" hay seeds or seeds collected from the previous year's hay crop, or using them to dilute pure mixtures such as are mentioned above.

Seeds of the highest quality only should be used. There is no difficulty in obtaining Perennial Ryegrass seed weighing from 26 to 28 lb. to the bushel, or Italian Ryegrass seed with a bushel weight of from 21 to 22 lb., and other grasses and clovers of a correspondingly high standard.

The seed should be purchased separately, tested, and, if found satisfactory, mixed at home and sown either immediately after the corn or when the corn crop is well braided. The seeds should be lightly harrowed in, and the land rolled. If the land is rough and lumpy, it should be rolled before the seeds are sown, otherwise many of the small seeds will be buried too deeply and will not grow.

The opinion prevails amongst farmers that once a pasture is laid down it requires no further attention. It is found, however, that pastures respond to a dressing of manure in the same way as other crops. On light dry soils the application of a mixture of equal parts of superphosphate and kainit at the rate of from 4 to 6 cwt. per statute acre may be made in the spring, every second or third year, with advantage.

On black, moory or clay soils, or where the land shows the presence of moss, Basic Slag at the rate of from 6 to 8 cwt. per acre usually gives beneficial results.

In spring all pastures should be chain harrowed and then rolled.

Leaflets relating to this subject, issued by the Department, are as follows:—

No. 8—Timothy Meadows.

No. 37—Field Experiments—Meadow Hay.

No. 46—Haymaking.

Copies of this article in leaflet form and of the above-mentioned leaflets may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin. Letters of application so addressed need not be stamped.

FLAX SEED, 1911.

DUTCH FLAX CROP.

An increased acreage under flax in Holland is reported for 1910. It would appear that in the districts whence sowing seed is derived this increase amounts to about 15 per cent. over the previous year's area.

Favourable weather was experienced up to the end of June, and the crop developed satisfactorily. In July heavy rain fell in some districts, and this interfered with the harvest. A good yield of seed was obtained, and samples of well-developed, even-coloured seed of a high standard of germination have been received by the Department from districts where the harvest was carried out under favourable conditions. In consequence of the unsuitable weather which prevailed during harvest in other districts the seed saved was discoloured and its germination seriously impaired.

Irish growers who intend to sow Dutch seed in 1911 should therefore pay particular attention to the condition, colour and germination of samples offered to them.

RUSSIAN FLAX CROP.

Reports furnished from Russia indicate that there was a slight increase in the acreage under flax in 1910.

In the earlier stages the weather was too dry for the favourable development of the crop. Later the climatic conditions improved and the flax made some recovery. In July, however, in parts of the country the crop was spoiled by insect attacks and the seed yield was in consequence much diminished. The harvest was carried out in some districts under favourable conditions, whilst in others the reverse was the case.

Russian seed for sowing in 1911 varies greatly in quality. Some high-class samples have been received by the Department, but good heavy Pernau Crown seed is reported to be scarce.

GENERAL

From the above report as to the harvest of seed in parts of Holland and Russia it is evident that it will be necessary for growers to be more than ordinarily careful this season in the selection of their sowing seed. Of all the more general crops, flax is the one for which the greatest caution is required in the purchase of seed. The Department would, therefore, urge on flax-growers the necessity of

having the germination, purity, and weight of their seed tested at the Seed Testing Station, at which, for a nominal charge of 3d. per sample, growers are afforded exceptional privileges of satisfying themselves as to the quality of the seed they propose to sow—(see Leaflet No. 59). Irish growers are well aware of the difference between the crop grown from good and that grown from bad seed, and know that the small extra outlay involved in the purchase of high-class seed is returned many times over in the superior yield and quality of the resulting crop.

The returns from field trials with varieties of flax seed carried out by the Department in various districts and on many classes of soils during the last ten years have shown that no definite rule can be laid down as to suitability of either variety of seed—Riga or Dutch—for a certain soil or district. In some years the first named variety has almost uniformly given the better results on all soils and in all districts, and in other years the latter variety has proved the better. Farmers are, therefore, advised not to confine themselves to the use year after year of either variety of seed, but to sow in any one year the seed which gives the best results on being tested.

Special envelopes in which to forward samples of seed for testing may be procured free of charge on application to the Department.

Copies of this article in leaflet form may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin. Letters of application so addressed need not be stamped.

FLAX EXPERIMENTS, 1909.

I.--MANURIAL EXPERIMENTS.

(a.) GENERAL.

As has been stated in previous reports, the first experiments conducted by the Department (1901-4 inclusive*) on the manuring of the flax crop showed that it does not respond to the application of the more general nitrogenous and phosphatic manures in quantities usual with other crops, but that a profitable increase in yield may be obtained through the use of manures containing potash.

A second series of experiments was then devised with a view to ascertaining which of the three potash manures in general use would give the best results with flax, whether it would be more advantageous to apply these manures in the autumn than at the time of sowing, and also whether the potassic manure might be profitably supplemented by a slow acting nitrogenous manure in the form of rape meal. These experiments were conducted during the years 1905-08,† inclusive, and, taking the average results over these years, the following conclusions may be drawn:—

- (1.) Whilst corresponding quantities of kainit and muriate of potash give much the same increase, either of these manures is to be preferred to sulphate of potash.
- (2.) The time of application of kainit or muriate of potash is a matter of minor importance, and one which may be left to the convenience of growers.
- (3.) Although in some seasons rape meal used in conjunction with kainit gave very profitable returns, the results were so irregular that the use of this mixture could not be recommended in preference to dressings of kainit or muriate of potash.

In view of the above results, and of those of some preliminary trials with small quantities of a quick-acting nitrogenous manure, the third series of experiments, instituted in 1909, was designed to afford information as to whether profitable returns would be given by the use of a small quantity of a relatively quick-acting nitrogenous manure, sulphate of ammonia, in place of heavier dressings of rape meal, and also whether the crop would respond profitably to the

* See Journal, Vol. II., pp. 636 et seq.; Vol. III., pp. 663 et seq.; Vol IV., pp. 616 et seq.; Vol. V., pp. 449 et seq.

† See Journal, Vol. VII., pp. 250 et seq.; Vol. VIII., pp. 423 et seq.; Vol IX., pp. 270 et seq.; Vol. X., pp. 279 et seq.

application of a non-acid phosphate manure in the form of steamed bone flour.

The 1909 experiments, therefore, comprised plots treated as follows:—

Plot 1.—Unmanured.

Plot 2.—Muriate of potash, $\frac{1}{2}$ cwt., and sulphate of ammonia, $\frac{1}{2}$ cwt. per statute acre.

Plot 3.—Muriate of potash, 1 cwt., and sulphate of ammonia, $\frac{1}{2}$ cwt. per statute acre.

Plot 4.—Muriate of potash, 1 cwt., and sulphate of ammonia, $\frac{1}{2}$ cwt. per statute acre.

Plot 5.—Muriate of potash, 1 cwt.; sulphate of ammonia, $\frac{1}{2}$ cwt.; and steamed bone flour, 2 cwt. per statute acre.

Plot 6.—Muriate of potash, 1 cwt. per statute acre.

These experiments were carried out at ten centres in counties Donegal, Londonderry and Tyrone. The plots, each one-tenth of a statute acre in extent, were measured by an officer of the Department, and the manures and seed were sown, weeding carried out, the produce pulled, retted, spread, stacked, scutched and baled under his supervision. At eight of the ten centres the experiments were conducted under the auspices of the local co-operative flax society, and the retted straw was scutched in their mill. The scutched flax was finally sent to Belfast, and there valued by three buyers appointed by the Flax Spinners' Association, who again placed their services at the disposal of the Department for this purpose.

The weather during the last three weeks of April was, on the whole, wet, and the ground in a more or less unsuitable state for sowing. Most of the plots were, therefore, not sown under such favourable circumstances as could be desired. The second and third weeks of May were dry, and the brairds suffered from want of moisture. Yellowing was noticeable to a considerable extent, especially where no potash manures had been applied. Rain fell during the last week of May, but the weather continued cold, and the dry winds which prevailed during the first half of June were very unfavourable to the growth of the crop. Towards the end of June, however, warm, showery weather set in, which greatly benefited the flax crop, and its appearance at this stage was, on the whole, promising. Towards the beginning of July cold, wet weather was again experienced, and this continued throughout that month. The growth of the crop was, therefore, checked before full development had been attained, and ripening was retarded. August was dry and warm, however, and the crop was saved under favourable conditions.

Riga Child Seed was sown on each plot at the rate of 55 quarts per statute acre. The dates of sowing the manures and seed and of pulling the flax at each centre are given in the following statement:—

Centre.	Date of Sowing.	Date of Pulling.
	1909.	1909.
River Finn Co-Operative Flax Society, . . .	April 15th.	Aug. 6th.
Castlefinn Co-Operative Flax Society, . . .	" 8th.	" 2nd.
Fyfin Co-Operative Flax Society, . . .	" 23rd.	" 10th.
Stranorlar Co-Operative Flax Society, . . .	" 24th.	" 12th.
Ardstraw Co-Operative Flax Society, . . .	" 19th.	" 9th.
Urney Co-Operative Flax Society, . . .	" 20th.	" 9th.
Letterkonny Co-Operative Flax Society, . . .	May 3rd.	" 16th.
Swilly Valley Co-Operative Flax Society, . . .	April 21st.	" 9th.
M. Chambers, Galdonagh, Manorcunningham,	" 16th.	" 6th.
J. Martin, Damhead, Coleraine, . . .	May 5th.	" 18th.

The plots at the various centres were inspected from time to time by the officer of the Department under whose supervision the experiments were carried out, and observations were made as to the effects of the different manures on the braids and the subsequent growth of the crop. The following is a summary of these observations:—

Plot 1.—The crop braided well, but at nine of the ten centres it "yellowed" more or less. At some centres the braid was not affected to any great extent, but at others it yellowed so badly that the young plants appeared to be dying off altogether. The crop at these centres made a good recovery, however, and the effect of the disease was not so noticeable at subsequent stages of growth as might have been expected.

Plot 2.—The crop braided well, but at nearly all centres the braid on this plot was also slightly affected with yellowing. A rapid recovery was made, however, and the subsequent growth of the crop was not affected to any material extent.

Plots 3 and 4.—Both these plots braided well, and the crop grew steadily throughout the season. No yellowing was observed. At the later stages of growth the crop on plot 4 appeared darker in colour and somewhat heavier than that on plot 3.

Plot 5.—A good braid was also obtained, and in the earlier stages the crop appeared to be making a more vigorous growth than was the case on any of the other plots. Subsequently, however, the crop on

this plot at almost all centres became badly infested with weeds, such as spurrey and redshank, which interfered greatly with the growth of the flax.

Plot 6.—The braird on this plot was also good and resisted yellowing. The subsequent growth was also satisfactory.

It will be noted that the effect of potash manures in preventing the disease known as yellowing has once more been demonstrated by these experiments. On Plot 1, which received no manure, yellowing was observed at all but one centre. On Plot 2, which got $\frac{1}{2}$ cwt. muriate of potash per statute acre, the brairds were slightly affected, while on the remaining four plots, all of which received 1 cwt. muriate of potash per statute acre, no yellowing occurred.

Full details as to the returns from each plot at the ten centres are given in Table I. (pp. 336-7).

The produce of plot 2 at Castlefinn centre was, unfortunately, destroyed by fire in the scutch mill.

EFFECT OF MURIATE OF POTASH USED ALONE.

	st.	lb.
Scutched flax per statute acre from unmanured plot	31	12
Scutched flax per statute acre from muriate of potash plot	37	12
Estimated profit per statute acre from use of muriate of potash	£2	7 4

Muriate of Potash at the rate of 1 cwt. per statute acre was applied to plot 6 at the time of sowing the seed. The effect of this dressing was to increase the yield of straw and scutched flax at eight of the ten centres. Taking the average results from the ten centres, however, it will be seen that a higher yield and a somewhat better quality of flax resulted from the application of muriate of potash, an extra profit of £2 7s. 4d. per statute acre remaining after deducting the cost of the manure. It will also be noticed that, on the average, a higher percentage of flax to retted straw was obtained from the use of this manure. This result confirms those of previous experiments in demonstrating that a potash manure may be profitably used with the flax crop.

EFFECT OF VARIOUS MIXTURES OF MURIATE OF POTASH AND SULPHATE OF AMMONIA.

Three plots were dressed with different quantities of these manures.

PLOT 2.

	st.	lb.
Scutched flax per statute acre from unmanured plot (average of 9 centres)	31	0
Scutched flax per statute acre from $\frac{1}{2}$ cwt. muriate of potash and $\frac{1}{2}$ cwt. sulphate of ammonia per statute acre (average of corresponding 9 centres)	38	4
Estimated profit per statute acre from use of this mixture	£2	11 4

PLOTS 3 AND 4.

	st.	lb.
Scutched flax per statute acre from unmanured plot	31	12
Scutched flax per statute acre from 1 cwt. muriate of potash and $\frac{1}{4}$ cwt. sulphate of ammonia	39	2
Estimated profit per statute acre from use of this mixture	£2	14 4
Scutched flax per statute acre from 1 cwt. muriate of potash and $\frac{1}{2}$ cwt. sulphate of ammonia	37	12
Estimated profit per statute acre from use of this mixture	£1	18 6

The use of the various mixtures of sulphate of ammonia and muriate of potash has given a higher yield of straw and scutched flax at nearly all centres than was obtained from the unmanured plots, and the average returns show that the use of each mixture resulted in a substantial profit.

The mixtures yielded in nearly all cases more straw than muriate of potash applied alone, and, on the average, the dressings applied to plots 2 and 3 have given higher yields of scutched flax and more profitable returns than muriate of potash. The latter manure has, however, given the greatest percentage of fibre from rotted straw.

$\frac{1}{4}$ cwt. more sulphate of ammonia was applied per statute acre to Plot 4 than to Plot 3. This increase resulted in a heavier yield of straw at five centres and of scutched flax at three. The average percentage of fibre from straw is less on Plot 4 than on Plot 3, and

the profit has been considerably decreased by the use of the larger quantity of sulphate of ammonia.

EFFECT OF A MIXTURE OF MURIATE OF POTASH, SULPHATE OF AMMONIA, AND STEAMED BONE FLOUR.

	st.	lb.
Scutched flax per statute acre from unmanured plot	81	12
Scutched flax per statute acre from 1 cwt. muriate of potash, $\frac{1}{4}$ cwt. sulphate of ammonia, and 2 cwt. steamed bone flour	34	4
Estimated loss per statute acre from use of this dressing	£0	2 2

As has already been noted, an outstanding feature at nearly all centres in case of Plot 5, treated as described above, was the abundance of weeds. It would appear that the steamed bone flour encouraged their growth. A like effect from the use of superphosphate was noticed in former experiments.

The mixture of muriate of potash, sulphate of ammonia, and steamed bone flour gave, as compared with the unmanured plot, an increased yield of straw at seven centres, and a heavier yield of fibre also at seven centres. The quality of the fibre was not materially improved, and the small increased yield not being sufficient to compensate for the cost of the manures a loss estimated at 2s. 2d. per statute acre resulted from their use.

Although, as recorded above, certain mixtures of sulphate of ammonia and muriate of potash have given better returns than muriate of potash alone, the Department would not as yet recommend that a dressing of the latter should be supplemented with sulphate of ammonia for the flax crop generally. Further experiments are, however, in progress.

(b.)—EXPERIMENTS WITH LIME.

At two centres plots treated with slaked lime and ground burnt lime, at the rate of 1 ton and 15 cwts. per statute acre respectively, were included in the experiments. The detailed results, together with the returns from the unmanured plots at each centre, are set out in Table II., from which it will be observed that at only one centre have these forms of lime produced an increase in the yield of scutched flax, and that this increase was more than sufficient to defray the cost of the lime. At both centres the slaked lime gave better results than the ground lime.

II.—SEED TRIALS.

A.—VARIETY TESTS.

(I.) GENERAL.

As in previous years, seed imported by the Department directly from Holland and Russia was tested against brands of Dutch and Russian seed imported by Ulster merchants and commonly sold in that province. Dutch Riga Child imported by the Department, two Belfast brands of Dutch seed, Pernau Crown imported by the Department, and one Belfast brand of Riga seed were tested in 1909.

The plots were one-tenth of a statute acre in extent, and were dressed with muriate of potash at the rate of 1 cwt. per statute acre. The Dutch seed was sown at the rate of 55 quarts per statute acre, and the Russian seed at nearly 60 quarts—a proportionate rate calculated on the results of the germination tests. All work in connection with the treatment of the plots and the produce was supervised by an officer of the Department, and the fibre was valued in Belfast by flax buyers appointed by the Flax Spinners' Association.

Full particulars of the returns from each variety of seed at each centre, and the average returns from all the centres where the experiments were conducted, are given in Table III. (pp. 338-9)

The three plots of Dutch seed braided well and grew satisfactorily. There was little difference to be observed between these plots until the flax ripened, when the Riga Child plot had the nicest colour. From Table III. it will be seen that the Riga Child seed imported directly by the Department gave a greater yield of straw at eight centres and of scutched flax at nine centres than the Belfast brands of Dutch seed. On the average of the ten centres the Dutch seed imported by the Department gave 5st 6lb. and 6st. more scutched flax per statute acre than the respective Belfast brands, and the money returns per acre were £2 13s. 7d. and £3 1s. 6d. in its favour.

The Pernau Crown seed imported by the Department produced more straw and fibre at eight centres than the Belfast brand of Riga seed, and on the average of all centres, 4 st. more scutched flax per statute acre. The average returns were £1 10s. 7d. per acre in favour of the Pernau Crown seed.

These results again demonstrate the extreme importance of care in the selection of flax seed, and that the extra charge made for first-rate seed is very small in comparison with the greater value of the crop produced.

Of the ten centres at which these experiments were conducted, nine are situated in districts where growers almost invariably sow

Riga seed. It will be observed, however, that the Dutch seed imported by the Department gave in eight cases a better yield of scutched flax than Pernau Crown seed, and on the average of all centres a crop worth over 80s. per acre more. These results confirm the conclusion drawn from previous trials that neither district nor class of soil (heavy or light) should be the factor by which a grower determines whether he will sow Dutch or Riga seed.

(II.) SPECIAL.

Further tests were carried out in 1909 with seed imported from some of the more easterly districts of Russia. Seed from Kostroma and Ouglitch was again tried, and also samples from the Rjeff and Pskoff districts, all being tested against Pernau Crown. In connection with these tests, a Russian brand of seed, Bierich, imported into Holland for sowing purposes, was tried, the requisite quantity of this seed being obtained from the stock imported by a Rotterdam merchant for his customers. The trials were carried out at three centres on plots one-sixth statute acre in extent. The Bierich seed arrived in a sufficiently pure state for sowing, but that from Ouglitch, Kostroma, Rjeff and Pskoff contained, as imported, a large quantity of impurities, and it was found necessary to reclean it before using it for sowing purposes. The germination capacity of all these varieties was considerably lower than that of the Pernau Crown seed, but the quantity of each sown was equivalent to a standard seeding of Pernau Crown, as indicated by the germination tests.

All operations in connection with these experiments were supervised by an officer of the Department, as was done in the case of the manurial and general variety tests, and the produce similarly valued in Belfast. Full details as to the results from the different varieties of seed above-mentioned are given in Table IV. (pp. 340-1).

It will be seen from an examination of this table that, while the yield of retted straw from the Pskoff seed was higher, and that from the Kostroma only slightly lower, than from the Pernau Crown, the percentage of scutched flax yielded from the straw is not nearly so high as in the case of the latter variety. The percentage of scutched flax to retted straw given by all five varieties is considerably lower than from the Pernau Crown, and the money value of the returns show a considerable balance in favour of the latter. This result shows also that Dutch growers do not obtain better seed from Russia than do Irish farmers, for the Bierich seed yielded an average gross return per acre of £11 8s. 11d. as compared with £13 19s. 6d. in the case of the Russian seed, Pernau Crown, imported directly into Ireland from Russia.

B.—SELECTION OF SEED.

Experiments in the selection of flax seed were again carried out in 1909, the seed used having been saved from crops grown in 1908 in the Letterkenny and Castlefinn districts. The seed saved in the Letterkenny district comprised lots from selected long stalks and from the general crop, respectively, while at Castlefinn seed was saved only from selected long plants. The Letterkenny-saved seed was sown in 1909 at two centres in the Letterkenny district on plots one-fifth statute acre in size, the Castlefinn seed being sown alongside it at one of these centres. The crop at this latter centre, however, proved a failure, being choked by weeds. The results from the other centre are again given in Table V. (pp. 340-1). It will be seen from this table that three samples of selected and unselected home-saved seed respectively were sown alongside a plot of Pernau Crown. The germination of the majority of these samples was lower than that of the Pernau Crown seed, but the seeding where necessary was increased proportionately. The plots were manured with muriate of potash at the rate of 1 cwt. per statute acre, and, as in the case of the other trials under review, all operations in connection with the crop were supervised by an officer of the Department, and the produce valued in Belfast by buyers selected by the Flax Spinners' Association.

An examination of the returns set forth in Table V. shows that, in regard to the two lots of home-grown seed sown on Plots 1 and 2, an increase of yield of straw and scutched flax has resulted from the selection of the seed. The unselected seed in the second lot, grown on Plots 3 and 4, gave the higher yield of straw, but the percentage of scutched flax to retted straw was greater from the selected seed. The third lot, grown on Plots 5 and 6, gave an exactly opposite result, the yield of straw from the selected seed being the greater, while the percentage of scutched flax to straw was less than from the unselected seed. There was no marked difference in the value of the flax from the different plots, and although the money value of the returns are in the case of two of the three lots somewhat in favour of the selected seed, the results are, on the whole, conflicting.

It will be noticed, however, that in every case the home-grown seed gave higher yields both of straw and scutched flax than was given by the Pernau Crown, although the percentage of fibre produced from the straw was higher in the case of the latter. The Pernau Crown also gave flax of a slightly better quality, but the money returns from the home-grown seed were higher. This result is not, however, in accordance with those of similar trials carried out in previous years, and the Department do not as yet feel justified in recommending the saving and sowing of home-grown seed.

TABLE I.—Showing the Results from the Application

No. of Plot.		1	
Manures applied per Statute Acre.		No Manure.	
Name of Co-operative Society or Farmer conducting the experiment.	Character of Soil.	Rotted Straw. lb.	Scutched Flax lb.
River Finn Co-operative Flax Society.	Medium loam ; clay subsoil.	2,850	540
Stranorlar Co-operative Flax Society.	Medium loam ; gravelly subsoil	3,260	520
Fyfin, Co-operative Flax Society.	Dark loam ; sandy subsoil.	2,920	490
Ardstraw, Co-operative Flax Society.	Heavy loam ; clay subsoil.	3,080	410
Urney Co-operative Flax Society.	Gravelly soil ; gravelly subsoil	3,900	670
J. Martin, Damhead, Coleraine.	Heavy loam ; clay subsoil.	1,860	250
Letterkenny Co-operative Flax Society.	Medium loam ; clay subsoil.	2,420	400
Swilly Valley Co-operative Flax Society	Medium loam ; tilly subsoil.	1,960	300
M. Chambers, Galdonagh, Manor Cunningham.	Light loam ; gravelly subsoil.	2,010	330
Castlefinn Co-operative Flax Society	Medium loam ; gravelly sub-soil	3,920	550
Average yield of Rotted Straw per statute acre.		2,818 lb.	
Average yield of Scutched Flax, per statute acre.		31 st. 12 lb.	
Percentage of Scutched Flax from Rotted Straw.		15.83	
Average value of Scutched Flax per stone.*		7s. 10½d.	
Average returns from Scutched Flax, per statute acre.		£12 10s. 1d.	
Average Returns from Tows, per statute acre.		7s. 1d.	
Total Average Returns from Flax and Tows, per statute acre.		£12 17s. 2d	
Cost of Manure,		—	
Estimated Profit per acre from use of Manure.		—	

* The flax grown on each plot at each centre was valued separately.

** As compared with the average of the no-manure

of Different Manures to the Flax Crop (1909).

2		3		4		5		6	
½ cwt. Muriate of Potash. ½ cwt. Sulphate of Ammonia.		1 cwt. Muriate of Potash. ½ cwt. Sulphate of Ammonia.		1 cwt. Muriate of Potash. ½ cwt. Sulphate of Ammonia.		1 cwt. Muriate of Potash. ½ cwt. Sulphate of Ammonia. 2 cwt. Steamed Bone Flour.		1 cwt. Muriate of Potash.	
Retted Straw. lb.	Scutched Flax. lb.	Retted Straw. lb.	Scutched Flax. lb.	Retted Straw. lb.	Scutched Flax. lb.	Retted Straw. lb.	Scutched Flax. lb.	Retted Straw. lb.	Scutched Flax. lb.
3,500	680	3,350	670	3,360	680	2,730	560	3,150	600
3,840	610	3,690	640	3,480	540	3,590	540	3,490	580
2,940	490	2,960	510	2,850	460	2,400	380	2,760	450
3,260	440	3,430	450	3,120	420	3,170	440	3,170	450
4,370	690	4,260	780	4,340	760	4,230	790	4,200	760
2,520	400	2,400	400	2,940	480	2,140	340	2,330	370
3,060	530	3,080	500	3,160	490	2,900	380	2,680	520
2,500	480	2,810	520	2,570	480	2,830	510	3,170	550
2,650	500	2,300	440	2,590	490	2,300	420	2,480	480
--	--	3,920	570	3,800	500	3,860	440	3,260	540
3,182 lb. 38st. 4lb. 16.83 8s. 0½d. £15 6s. 7d. 6s. 1d. £15 12s. 8d. 12s. 6d. £2 11s. 4d.**		3,223 lb. 39st. 2lb. 17.00 8s. 1½d. £15 18s. 4d. 6s. 11d. £16 5s. 2d. 13s. 9d. £2 14s. 4d.		3,221 lb. 37st. 12lb. 16.45 8s. 0½d. £15 5s. 7d 7s. 7d. £15 13s. 2d. 17s. 6d £1 18s. 6d.		3,015 lb. 34st. 4lb. 15.92 7s. 10½d. £13 10s. 9d. 8s. 6d. £13 19s. 3d. £1 4s. 3d. Loss of 2s. 2d.		3,071 lb. 37st. 12lb. 17.26 8s. 1½d. £15 7s. 9d. 6s. 11d. £15 14s. 8d. 10s. £2 7s. 4d.	

These figures represent the average of the valuations.
plots at the corresponding nine centres

TABLE II.—Showing the Results of the Application of Slaked

No. of Plot.		
Dressings applied per statute acre.		
Name of Co-operative Flax Society or Farmer conducting the experiment.	Character of Soil.	Retted Straw. lb.
J. Martin, Damhead, Coleraine. . .	Heavy loam ; clay subsoil.	1,860
Castlefinn Co-operative Flax Society, .	Medium loam. gravelly subsoil.	3,920

TABLE III.—Showing the Returns from Trials

No. of Plot.		1	
Variety of Seed.		Dutch Riga Child imported by the Department.	
Name of Co-operative Flax Society or Farmer conducting the experiment.	Character of Soil.	Retted Straw. lb.	Scutched Flax. lb.
River Finn Co-operative Flax Society..	Medium loam ; clay subsoil. .	3,150	600
Stranorlar " "	Medium loam ; gravelly subsoil	3,490	580
Fyfin " "	Dark loam ; sandy subsoil. .	2,760	450
Ardstraw " "	Heavy loam ; clay subsoil. .	3,170	450
Urney " "	Gravelly soil, gravelly subsoil .	4,200	760
J. Martin, Damhead, Coleraine, . .	Heavy loam ; clay subsoil. .	2,350	370
Letterkenny Co-operative Flax Society	Medium loam ; clay subsoil. .	2,680	520
Swilly Valley " "	Medium loam ; tilly subsoil. .	3,170	550
M. Chambers, Galdonagh, Manorcunningham.	Light Loam ; gravelly subsoil.	2,480	480
Castlefinn Co-operative Flax Society, .	Medium loam : gravelly subsoil	3,260	540
Average yield of Retted Straw per statute acre,		3,071 lb.	
Average yield of Scutched Flax per statute acre,		37st. 12lb.	
Percentage of Scutched Flax from Retted Straw,		17.28	
Average value of Scutched Flax, per stone,		8s. 1½d.	
Average Returns from Scutched Flax per statute acre,		£15 7s. 9d.	
Average Returns from Tows per statute acre,		6s. 11d.	
Average Returns from Flax and Tows per statute acre,		£15 14s. 8d.	

¹ The flax grown on each plot at each centre was valued separately.

and also Ground Burnt Lime to the Flax Crop, 1909.

1		2			3		
Untreated.		1 ton Slaked Lime costing 15s. 0d.			15 cwt. Ground Burnt Lime, costing 18s. 9d.		
Scutched Flax. lb.	Value of Scutched Flax. per stone.	Retted Straw. lb.	Scutched Flax. lb.	Value of Scutched Flax. per stone.	Retted Straw. lb.	Scutched Flax. lb.	Value of Scutched Flax. per stone.
250	s. d. 9 0	2,450	390	s. d. 8 9	2,300	380	s. d. 8 6
550	8 6	3,740	540	8 0	3,640	500	8 3

of Different Varieties of Flax Seed (1909).

2		3		4		5	
Belfast Dutch (A), purchased in Ulster.		Belfast Dutch (B), purchased in Ulster.		Pernau Crown, imported by the Department.		Belfast Riga, purchased in Ulster.	
Retted Straw lb.	Scutched Flax. lb.	Retted Straw. lb.	Scutched Flax. lb.	Retted Straw. lb.	Scutched Flax. lb.	Retted Straw. lb.	Scutched Flax. lb.
3,230	660	3,080	580	2,970	590	2,420	460
3,150	480	3,000	440	3,410	590	3,290	520
2,240	340	2,380	350	2,240	360	2,070	300
2,880	390	2,870	380	2,900	420	2,920	370
3,950	660	4,050	650	4,180	760	3,880	710
2,000	310	1,660	240	1,850	290	1,680	250
3,060	420	2,800	440	2,440	440	2,680	450
2,260	410	2,520	470	2,590	440	2,240	360
2,260	420	2,520	490	2,240	460	2,200	370
2,990	460	2,820	420	3,500	490	3,430	490
2802 lb. 32st 6lb. 16.24 7s. 10d. £12 14s. 6d. 6s. 7d. £13 1s. 1d.		2,770 lb. 31st 12lb. 16.10 7s. 9d. £12 6s. 7d. 6s. 7d. £12 13s. 2d.		2,832 lb. 34st 8lb. 17.09 8s. 0d. £13 16s. 5d. 6s. 2d. £14 2s. 7d.		2,681 lb. 30st 8lb. 15.96 8s. 0½d. £12 5s. 4d. 6s. 8d. £12 12s. 0d.	

These figures represent the average of the valuations.

TABLE IV.—Showing Results of Trials of Different

No. of Plot.		1	
Variety of Seed.		Pernau Crown.	
Name and Address of Farmer.	Character of Soil.	Retted Straw. lb.	Scutched Flax. lb.
T Elliott, Drummurphy, Castlefinn, .	Medium loam ; gravelly subsoil	3,006	516
J. Foy, Dreenan, Stranorlar, .	Dark soil ; clay subsoil. .	2,226	402
W. King, Scriblew, Letterkenny, .	Medium clay ; tilly subsoil, .	2,688	468
Average yield of Retted Straw per statute acre,		2,640 lb.	
Average yield of Scutched Flax per statute acre,		33st.	
Percentage of Scutched Flax from Retted Straw,		17.5	
Average value of Scutched Flax per stone,		8s. 4d.	
Average Returns from Scutched Flax per statute acre,		£13 15s. 3d.	
Average Returns from Tows per statute acre,		4s. 3d.	
Average Returns from Flax and Tows per statute acre,		£13 19s. 6d.	

TABLE V.—Showing the Returns from Various Kinds of Irish

No. of Plot.	1	2
	Selected Dutch Child.	Unselected Dutch Child.
Variety of Seed.		
Yield of Retted Straw per statute acre,	3,965 lb.	3,870 lb.
Yield of Scutched Flax per statute acre,	38 st. 13 lb.	37 st. 7 lb.
Percentage of Scutched Flax from Retted Straw	13.75	13.57
Value of Scutched Flax per stone,	8s. 3d.	8s. 4½d.
Returns from Scutched Flax per statute acre,	£16 1 2	£15 14 1
Returns from Tows per statute acre,	10s. 5d.	8s. 7d.
Total Returns from Flax and Tows per statute acre.	£16 11 7	£16 2 8

Varieties of Russian Flax Seed (1909).

2		3		4		5		6	
Bierich.		Kostroma.		Rjeff.		Oughtch.		Pskoff.	
Retted Straw. lb.	Scutched Flax. lb.	Retted Straw. lb.	Scutched Flax. lb.	Retted Straw. lb.	Scutched Flax. lb.	Retted Straw. lb.	Scutched Flax. lb.	Retted Straw. lb.	Scutched Flax. lb.
2,970	468	3,120	492	3,024	456	3,060	438	2,964	450
1,848	282	2,202	390	2,028	348	2,184	384	2,106	360
2,502	402	2,550	408	2,646	402	2,226	366	2,922	468
2,440 lb. 27st 6lb. 15-74 8s. 1½d. £11 3s. 10d. 5s. 1d. £11 8s. 11d.		2,624 lb. 30st 10lb. 16-39 8s. 3d. £12 13s. 11d. 5s. 2d. £12 19s. 1d.		2,566 lb. 28st 10lb. 15-67 8s. 3d. £11 16s. 11d. 5s. 5d. £12 2s. 4d.		2,490 lb. 28st 4lb. 15-9 8s. 2d. £11 10s. 11d. 5s. 6d. £11 16s. 5d.		2,664 lb. 30st. 6 lb. 15-99 8s. 0½d. £12 11s. 8d. 5s. 7d. £12 17s. 3d.	

Saved Seed as compared with those from Pernau Crown Seed.

3	4	5	6	7
Selected Dutch Child.	Unselected Dutch Child.	Selected Dutch Child.	Unselected Dutch Child.	Pernau Crown.
3,475 lb.	3,635 lb.	3,870 lb.	3,750 lb.	3,360 lb.
35 st. 5 lb.	35 st.	37 st. 7 lb.	38 st. 13 lb.	34 st. 4 lb.
14-24	13-48	13-57	14-53	14-29
8s. 0d.	8s. 0d.	8s. 3d.	8s. 4½d.	8s. 6d.
£14 2 10	£14 0 0	£15 9 5	£16 6 0	£14 11 5
9s. 11d.	8s. 3d.	8s. 10d.	9s. 8d.	5s. 5d.
£14 12 9	£14 8 3	£15 18 3	£16 15 8	£14 16 10

SCIENCE AND ART MUSEUM.

[*** It is intended to publish, at intervals, in the JOURNAL articles dealing with the work done in the National Museum of Science and Art. The first series of articles is appended.]

I.—NATURAL HISTORY COLLECTIONS.

When it was found necessary last year to construct a new entrance to the Natural History building from Merrion Square, it was decided to re-arrange the collections contained in the lower room. The collections illustrating the Irish fauna have increased to such an extent that the whole of the floor of this room is now devoted to the exhibition of Irish animals both living and extinct.

A visitor entering by the new door from Merrion Square, now finds three of the best examples of the extinct Irish Giant deer (the so-called Irish Elk) facing the entrance. On each side of the door are cases illustrating the cave researches in Ireland. Many remains of extinct animals, and some of the implements of Early Man which have been found in these caves, are shown in these cases.

The first of the three sections of the room is devoted to the Irish Beasts or Mammals. The old Irish red deer, the various kinds of rodents, bats and insectivores, as well as figures of all the Irish whales, dolphins and porpoises, have been placed in a central case, while groups of the otter, rabbit, fox and seals illustrate the habits and modes of life of these creatures. The general collection of Irish Carnivores is in a case by itself.

The window cases have been utilized for the exhibition of the large series of nests and eggs of the birds found wild in Ireland, whereas the wall cases contain the Irish birds, a list of which has recently been written by Mr. Ussher, and is on sale in the Museum. Groups of Irish birds in their natural surroundings occupy the centre of the second section of the floor. The fishes found in the Irish lakes and rivers and in the Irish marine area are shown in the wall cases of that section.

A new feature in this exhibition is the special reference which has been made to the Irish fisheries and their annual value to the country, according to the reports issued by the Fisheries branch of the Department.

The third section of the floor is now in course of arrangement. It will take some time to complete it, as large number of insects, land mollusks, spiders, and marine invertebrates remain to be mounted and identified.

To make the collection instructive and useful to the general public as well as to students has been the particular aim of the Museum staff. Special facilities are now provided by the establishment of a students' room for University and College students who wish to examine specimens more minutely.

In this room students may handle particular sets of specimens and work with the microscope. Several hundred students have already availed themselves of this opportunity to work in the room.

A problem that has frequently been discussed by teachers and others interested in education is the question as to the manner in which the study of Natural History should be commenced by the young. It has generally been felt that our aim should be to interest children in the personal acquisition of knowledge.

With that object endeavours have been made to stimulate such an interest by what has been called "Nature Study," flowers and other natural history specimens having been brought to the school-room and explained there. It is not easy, however, to dissociate ordinary school tasks, in the pupil's mind, from studies of that description. Hence it is, perhaps, better that nature studies should take place in the open air, or in a Museum. To keep living objects in a Museum is not feasible. On the other hand, it has been tried to imitate living objects by placing preserved forms of animal life in their natural surroundings. Birds have been exhibited in our National Museum for some years past in that manner. Any attempts, however, to illustrate the lower forms of marine life in their natural surroundings have hitherto been attended with almost insurmountable difficulties.

It was thought that if a representation of a rock-pool, showing the wealth of life left by the receding tide, could be exhibited in the Museum, the object of nature study might be greatly aided. The task was a difficult one, because the production of the model was dependent on the discovery of a liquid which preserved the shape and colour of the animals, and yet did not evaporate like ordinary spirit. After many fruitless researches a liquid, which possessed almost all the desired qualities, was at last found by Mr. Southern, a member of the Museum staff.

The model of the rock-pool was constructed, under his superintendence and guidance, by Miss Barnes, who has been for some time employed in the Museum. It is now finished and exhibited in the lower hall of the Natural History building. Limpets, periwinkles, and acorn shells cover the face of the rocks surrounding the pool, and among the seaweed, sea anemones of various shapes and colours extend their long tentacles in search of prey. On the floor of the pool are star-fish, sea-urchins, and crabs of different kinds, while a squat-lobster puts forth its claws from underneath a stone, ready for any morsel of food that may be washed in by the

tide. The habits and modes of life of the various creatures to be found in a rock-pool are thus vividly placed before the visitor in a manner that has never before been attempted, and it is to be hoped that school teachers will draw the attention of their pupils to this novel and instructive exhibit.

During the course of the Scientific investigations carried on by the Fisheries Branch of the Department since the year 1899, large collections of marine animals have been obtained by dredging and by shore-collecting round the Irish coast.

Some of these collections have been deposited in this Museum for custody and examination, among them the Sea-mats (Polyzoa). A list of these, prepared by Mr. Nichols, will shortly be published by the Fisheries Branch.

The Polyzoa form colonies, each consisting of a number of distinct and similar minute animals. Few of them have a popular name. Some are termed Zoophytes, others are called sea-mats, and others again corallines. They vary greatly in appearance, sometimes occurring as bushy tufts or as broad fronds with a superficial resemblance to seaweeds, and sometimes they are of a calcareous nature, occurring as coral-like forms or as patches or crusts on shells, stones, etc. A large number of species of Polyzoa are often found on a single shell or stone, and the greater part of the collection obtained by the Fisheries Department consists of encrusting forms.

Another piece of work accomplished lately was the examination and description by Miss Stephens of the various kinds of Corals obtained off the Irish coast by the Department's steamer "Helga." The account of these corals (with notes on other Irish specimens and a description of a new species by Prof. Hickson) was published by the Fisheries Branch of the Department. (Fisheries, Ireland, Sci. Invest., 1907, V. [1909].) All the specimens described in this paper have been deposited in the Museum.

Owing to the extensive field work carried out during the last two years on Clare Island, in which some members of the Museum staff took part, large numbers of invertebrate animals have been added to the collections. The preservation, identification and mounting of the material are laborious tasks which are being carried out by the staff during such time as can be spared from the ordinary Museum duties. It is certain that the result of this survey will be the addition to the Museum collections of many rare and hitherto unknown species, especially amongst the insects in charge of Mr. Halbert.

A new feature in the Museum arrangement will be found in the "Recent Additions" collection, which is shown at the foot of the main staircase. Amongst other interesting exhibits many different kinds of silk-producing moths are shown here with their cocoons, also some of the rare and brilliantly coloured Bird-butterflies from tropical countries belonging to the genus *Ornithoptera*.

B. F. S.

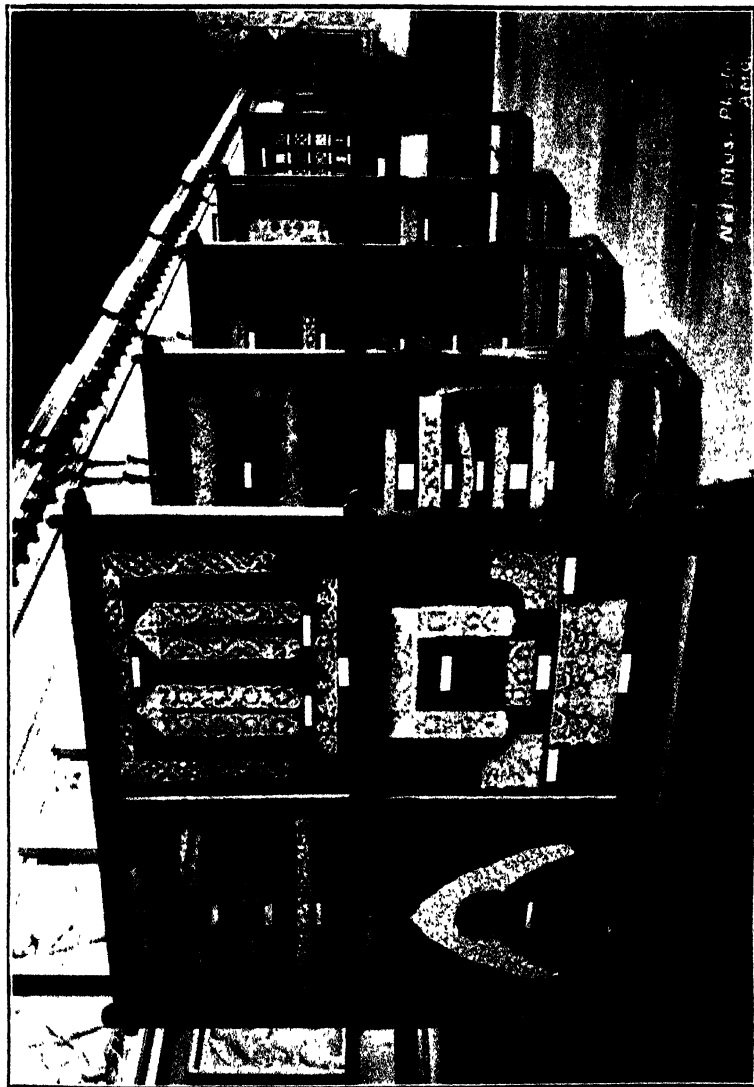


Fig. 1.—Part of Lace Collection.

SCIENCE AND ART MUSEUM—INDUSTRIAL DIVISION.

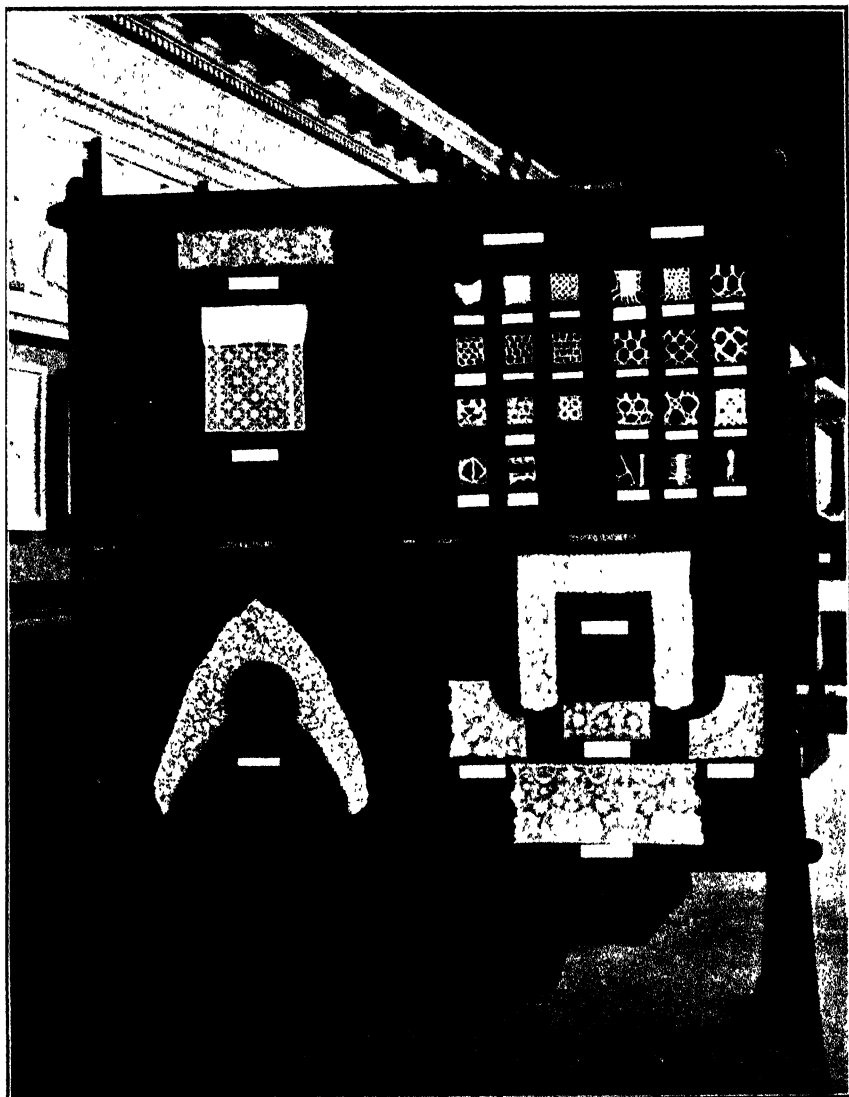


Fig. 2.—A Stand of Lace Frames.

II.—ART AND INDUSTRIAL DIVISION.

THE NATIONAL MUSEUM LACE COLLECTION.

In view of the importance of the lace industry in Ireland it has been the aim to make the Museum collection of hand-made lace representative of all the best-known varieties, and to exhibit it in such a manner as to make it most useful to those interested. For many years the collection was located with embroideries, textiles, and costume, in a poorly lighted room (F. X.), entirely unsuited to the exhibition of a material of such fine texture, and consequently no efforts to display it properly could be successful. A few years ago, however, the eastern end of the Main Gallery was allocated to it. Special frames, about three feet square, lined with deep blue velvet, were prepared, and the whole collection, consisting of some five hundred specimens, was arranged in them. The frames are hung on stands (see Figs. 1 and 2) in two horizontal rows, the lower one at such a height that not much stooping is necessary in examining the specimens, whilst for convenience in inspecting those in the upper row, narrow platforms are provided. The result proved very satisfactory: the ample roof light, the dark velvet background, which throws the specimens vividly into relief, and the liberal space allotted to each piece, all contribute towards the ideal mode of exhibition of this important fabric. The inadequacy of the former location may be estimated from the fact that the specimens, formerly crowded into an area of fifty or sixty square yards, filled one hundred and forty of the new frames, each with a superficies of one yard. Definite classification was found difficult to achieve, owing to overlapping in several directions of the different varieties, and to other obstacles such as inevitably present themselves in all attempts at museum arrangement. The collection is, however, broadly divided into (a) needlepoint lace, (b) bobbin-made or "pillow" lace, and (c), for want of a better term, "mixed" lace, that is lace in which the fabric is not entirely built up with the needle alone, or the bobbin alone, but is either constructed on a foundation of some woven material such as square or hexagonal mesh net, or fine linen or cambric, or, further still, is a combination of needlepoint and bobbin work. There are a few unclassified varieties (d).

The following is a list of the different varieties in the collection:—

(a) **Needlepoint:—**

ITALIAN:

Punto in Aria.
 Raised Point (*gros point*
de Venise). (Fig. 3.)
 Flat Point.
 Grounded Venetian Point.
 Point de Burano.

FRENCH:

Point d'Alençon.
 Point d'Argentan.
 Point de France.

FLEMISH:

Brussels (Point de Gaze).

IRISH:

Flat Point—Youghal.

(Fig 4.)

do. Kenmare.

Raised Point—Innishmac-
saint.

Raised Point—Cappoquin.

(b) **Bobbin made:—**

FRENCH:

Valenciennes, fausse.

do. vraie.

Chantilly.

Lille.

Blonde.

FLEMISH:

Brussels.

Mechlin.

Binche.

Antwerp (potten kant).

ITALIAN:

Milanese "point."

Genoese "point."

do. plaited lace.

Lecce (Sicily).

ENGLISH:

Honiton.

Buckingham.

Bedford.

Northampton.

SCOTTISH:

Hamilton.

IRISH:

Dublin.

Inistiogue.

Cong.

RUSSIAN:

Guipure.

MALTESE.

(c) **"Mixed" Lace:—**

ITALIAN:

Darned Net ("laci").

Drawnwork.

Reticella, or Greek Lace.

FRENCH:

Drawn and Embroidered
Work.

DANISH:

Drawn-work (Tønden).

FLEMISH:

Mixed Needlepoint and
Bobbin Lace.

Orotova (Canary Islands).

Drawn-work.

IRISH:

Limerick, tambour.

do. run.

Carrickmacross, applique.

do. guipure.

Newtownbarry, "Greek
Lace."

Dublin, blonde.

(d) **Miscellaneous:—**

Crochet.

Knitted Lace.

Tatting.

Arranged with the lace collection, although they do not come exactly in the same category, are some beautiful specimens of fine white embroidery on cambric. These are, for the most part, of Irish manufacture. A few are of English origin.

At the beginning of the series is a frame containing illustrations, worked in coarse white cord, of details found in needlepoint lace, and in the various kinds of bobbin lace. The large scale enables the



Fig. 3.—Rabat, Venetian raised point, XVIIth Century (15-1878).

SCIENCE AND ART MUSEUM—INDUSTRIAL DIVISION.

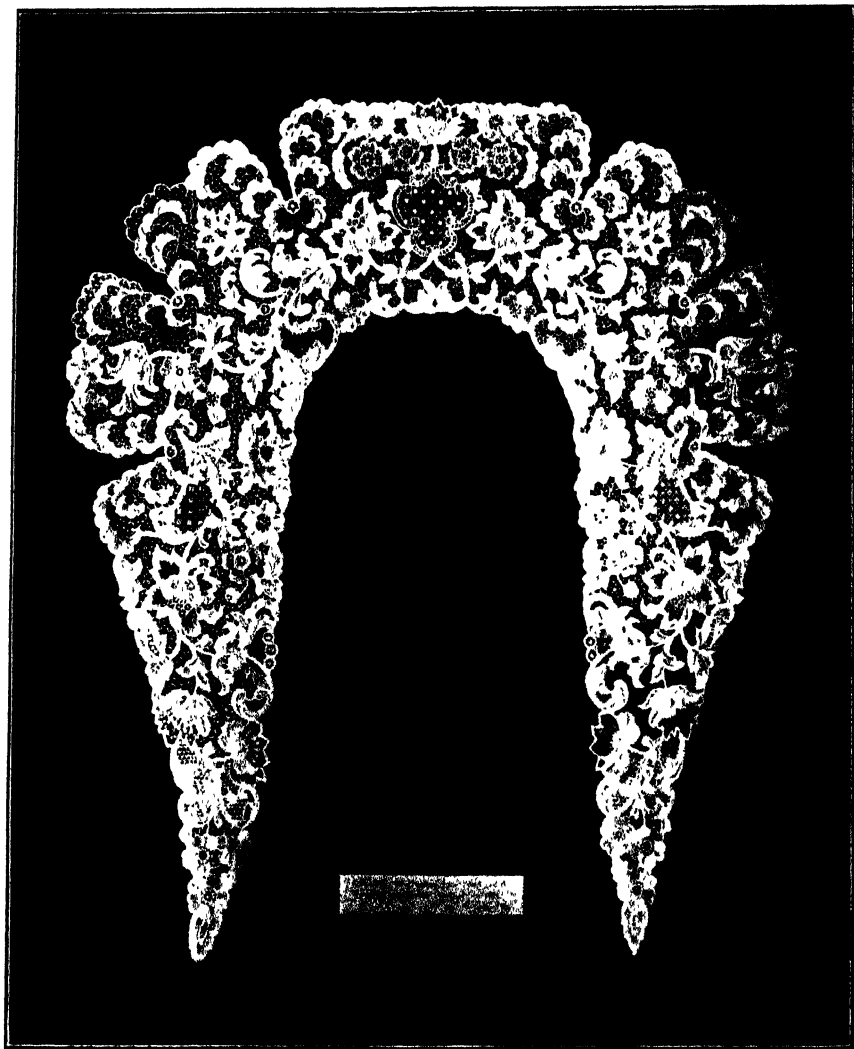


Fig. 4.—Collar, flat point Youghal, modern (298-1906).

structure to be understood without the strain entailed in examining the minute texture of actual specimens. These enlarged models are a help in ascertaining whether a piece of lace has been made with the needle or with bobbins, and, if the latter, with a *réseau* or ground, to which particular variety it belongs—Brussels, Mechlin, etc.

Alongside several of the specimens of lace in the collection are placed photographic enlargements (1:6) of portions of the work. The particular portion photographed, generally about a square inch, is indicated on the specimen by a white cardboard pointer.

Partly worked specimens of needlepoint and bobbin lace are exhibited in a table-case with the collection. These also are helpful in distinguishing between the two kinds.

Photographs of fine lace specimens in other museums and in private ownership are arranged in draw-out cabinets, together with some early designs from old pattern books.

The following works, all, or nearly all, in the National Library, will be of help to those who wish to study the subject of lace in detail:—

Seguin: *La Dentelle*. Paris, 1875.

A. S. Cole: *Ancient Needlepoint and Pillow Lace*. London, 1875.

Ben Lindsey: *Irish Lace*. Dublin, 1886.

A. S. C. [ole]: *A Renaissance of the Irish Art of Lace-making*. London, 1888.

A. M. S.: *Point and Pillow Lace*. London, 1899.

Lefébure: *Embroidery and Lace* [Translated from the French by A. S. Cole]. London, 1899.

Jackson and Jesurum: *History of Hand-made Lace*. London, 1900.

Channer and Roberts: *Lace-making in the Midlands* [England]. London, 1900.

Mrs. Bury Palliser: *History of Lace* [Revised by M. Jourdain and Alice Dryden]. London, 1902.

Hudson Moore: *The Lace Book*. London, 1905.

A. S. Cole: *Irische Spitzen* [Irish Lace]. Stuttgart.

Jourdain: *Old Lace*. London, 1908.

Pollen: *Seven Centuries of Lace*. London, 1908.

In addition, articles dealing with the subject will be found in the art periodicals—"The Art Journal," "The Burlington Magazine," and "The Connoisseur." Those in the "Connoisseur" are exceedingly well illustrated.

THE ANDREWS LOAN COLLECTION OF CHINESE PORCELAIN.

The Museum has been fortunate in acquiring on loan from Mr. J. T. Andrews some fine pieces of Chinese porcelain, dating from the later reigns of the Ming Dynasty (1367-1643) to the close of the 18th Century.

The pieces of blue and white are exceptionally fine examples. The earliest of these, a square bottle with cylindrical neck, is painted with a typical Chinese landscape with mountain scenery, and has the fine paste but somewhat heavy potting of the Ming period.

Blue was used in the decoration of Chinese porcelain early in the Ming Dynasty. The quality and density of the colour and the variety of tints were dependent upon the supply of cobalt from which the blue was obtained. During the reign of Hsüan-te (1426-1435), blue was imported from Western Asia, but the supply failed several times throughout the Ming Dynasty and the native cobalt, which did not produce the fine tints of the imported pigments, had to be used. It was during the reign of Kang-hsi (1662-1722), in the following Dynasty, however, that the best blue and white porcelain was produced. The blues vary much in shade, but are always of excellent quality, and contrast well with the intense whiteness of the ground. The pieces are well potted, the paste being usually of a fine, unctuous nature, and the forms graceful. It is to this period that the two Ginger Jars (fig. 1) are ascribed. These jars, which have their original covers, are decorated with sprigs of the *Prunus*, or wild plum, in blossom (usually called "hawthorn" pattern), left in white on a brilliant deep blue ground intersected with darker lines resembling the cracks of ice. The *Prunus* is the floral emblem of the New Year, when the Chinese give presents of fragrant tea and preserved fruits, and the cracking ice is a poetical allusion to the approaching Spring. Good specimens of these Kang-hsi blue and white ginger jars are rare, and are much sought after.

The tall cylindrical vase (fig. 5), with a procession of figures (bringing gifts to the Emperor?) and precipitous rocks in the background, is decorated with a particularly deep rich blue. This piece is believed to have come from the Dresden collection of Augustus the Strong, of Saxony.

A pair of vases, decorated with lotus-shaped panels, and a vase with Vandyke border, are also good examples of Kang-hsi blue and white.

There is another variety of blue and white porcelain in this collection which is very uncommon—the so-called soft paste. The paste itself is a rather hard, opaque, earthy substance, but it is glazed with a soft, steatite glaze, fired at a low temperature whilst

SCIENCE AND ART MUSEUM—LOAN COLLECTION OF
CHINESE PORCELAIN.



Fig. 1.—Pair of Prunus Pattern ginger jars, blue and white, Kang-hsi period.



Figs. 2 and 3.—Ginger jar and vase, blue and white, soft paste, Kang-hsi period.

SCIENCE AND ART MUSEUM—LOAN COLLECTION OF
CHINESE PORCELAIN.



Figs. 4, 5, 6. Figures 4 and 6—two figures of Kuan-yiu (Fig. 4 in Fukien *blanc de chine*. Fig. 6 finely painted in enamel colours). Fig. 5—Cylindrical vase, blue and white, Kang-hsi period.

SCIENCE AND ART MUSEUM—LOAN COLLECTION OF
CHINESE PORCELAIN.

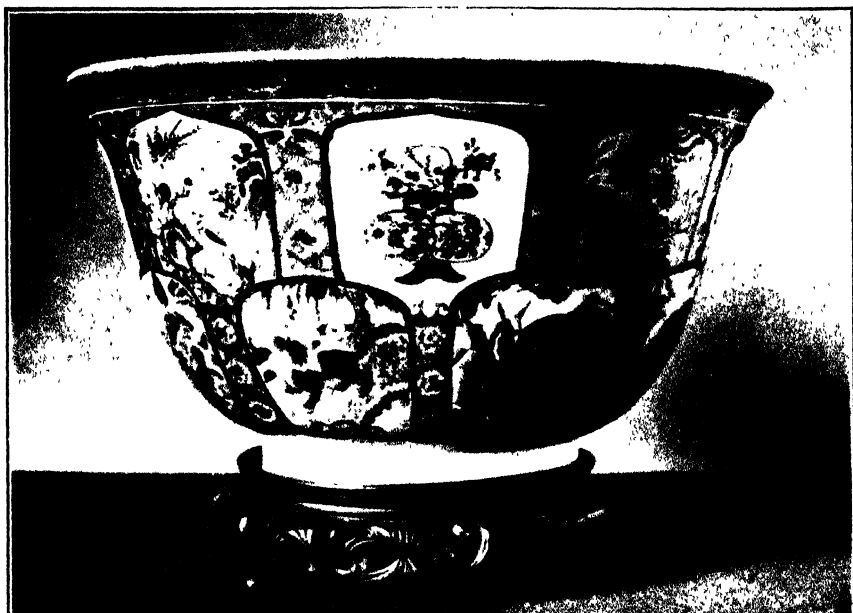


Fig. 7.—Large Bowl—*famille verte*, Kang-hsi period.



Figs. 8, 9 and 10.—Figs. 8 and 10—Pair of Vases, turquoise, with relief decoration. Kien-Lung period with French (Empire) brass mounts. Fig. 9—Kylin, in mauve and purple flambé.

SCIENCE AND ART MUSEUM—LOAN COLLECTION OF
CHINESE PORCELAIN.



Figs. 11 and 12. Fig. 11—Peach bloom vase with engraved ornament. Fig. 12—Vase with purple glaze streaked with light blue waterfall flambé.

the ware is in the biscuit stage, that is, after the first firing, contrary to the usual Chinese method. These "soft paste" pieces are much lighter in weight, however, than the usual hard paste. Mr. Andrews' two pieces, the ginger jar (fig. 2), with carved-wood cover, and the vase (fig. 3), are good specimens of this soft paste. They are probably Kang-hsi, although the vase, which has a ring hanging from each handle, bears the chia-ching mark (1522-1566). The dragon and phoenix on the vase are the emblems of the Emperor and Empress respectively.

The two figures of Kuan-yin (figs. 4 and 6)—a Buddhist deity, goddess of Mercy—are much larger than the usual figures of this goddess. The plain one, made in the province of Fuchien, belongs to the class called by the French *blanc de chine*, and has the pale straw tint so much admired by connoisseurs. The coloured figure is finely painted in the enamel colours in vogue towards the end of the Kang-hsi period (1662-1722).

The bowl (fig. 7) is a very fine specimen of the *famille verte* class, so-called because green predominates in the colour scheme. It is finely painted with grotesque animals, birds, and baskets of flowers, in black-edged panels, on a stippled green ground brocaded with flowers and butterflies. It belongs also to the Kang-hsi period.

Of the *famille noire* class there is a fine vase decorated with pink pæonies on a greenish black ground.

Variogated glazes (*flambés*) are represented by three pieces. The archaic-shaped vase (fig. 12), a fine stoneware, purple, streaked with pale blue (waterfall flambé); a Kylin (fig. 9)—a mythical animal somewhat resembling the unicorn, of benevolent disposition and a herald of good fortune—decorated with different shades of mauve and purple; and a bulbous-shaped vase of purple, streaked with pale blue. These wonderful colour creations are due to the effect of the varying heat of the furnace on the metallic oxides in the glaze.

Among the pieces with monochrome decoration are some fine colour effects. Two vases of a rich red, known as "sang de pigeon," finely crackled; a small vase of a pale blue shade which the Chinese call "the blue of the sky after rain"; a vase (fig. 11) of a pale peach bloom shade, finely engraved with a dragon and floral ornament—probably all late Kang-hsi or early Kien Lung; a temple vessel, with celadon glaze and engraved ornament, marked with the Kien Lung mark (1722-96); and two vases (figs. 8 and 10) turquoise, fluted, with relief decoration, probably late Kien Lung, with French gilt brass mounts of the Empire Period.

Finally, there is a vase with robin's egg *soufflé* decoration, the colour, in this case, pale blue, being blown on to the ground of brown (through a tube with gauze at the end), and producing a fine mottled effect resembling a robin's egg.

Mr. Andrews has kindly consented to lend this collection for a period of four months.

A. J. T.

DISH RINGS.

Old Silver Dish Rings, or, as they are erroneously called at the present day, "Potato Rings," appear to be almost exclusively of Irish make. One or two English ones, however, have been found, but these are probably contemporary copies of Irish examples.

What was their origin, or when they were first introduced is not known, though the idea of a waisted cylinder as a stand for bowls, etc., is found in Ancient Egypt.

The rings may have been evolved from the dish crosses, which are mentioned before any record of rings occurs. It is a curious fact that although these Dish Rings were made in Ireland, only a little over one hundred years ago, nothing actually definite is known as to their use. The most probable theory is that they were stands for circular punch bowls, to prevent the hot bowl from marking the mahogany table, or they may have been used for bowls for fruit, salad, etc.

They are mentioned in auction advertisements in old newspapers as "a Dish Stand," in 1756 and 1762; "A Ring for a Table" in 1776; "a Dish Ring" in 1778; and "A Ring for the centre of a Table" in 1780. In the assay books of the Dublin Guild of Goldsmiths, of about 1780-1790, they are always called "Dish Rings," which in those days was equivalent to Bowl Rings.

The earliest examples which, up to the present, have come to light, date from about 1765, and the latest about 1795, so that it is probable that between 1750 and 1800 would be the extreme limits of the period in which they were made. Large numbers were produced in Ireland, and between about 1770 and 1780 the fashion appears to have been at its height; most of the examples found at the present day having been made between these dates. In the years 1787 and 1788, the numbers made in Dublin were about twenty-five each year, but a little later the demand appears to have declined, and after 1800 no mention of them is made in the assay books.

The Irish Dish Rings were always circular, and almost always hall-marked on the rims, which were cut from a separate piece of silver and soldered to the body. These rims were formed of straight pieces of silver bent round and soldered, the joint formed by the ends being usually perceptible. If two or more joints are noticed in the rim, it is highly probable that a hall-marked piece of silver has been let in, and that the ring is a forgery.

Irish Dish Rings may be roughly classed under three heads, viz.:—Those pierced and repoussé with animals, human figures, birds, foliage and scrolls; those pierced so as to form a design, and the parts remaining either left plain or decorated with "bright cutting";

SCIENCE AND ART MUSEUM—DISH RINGS.

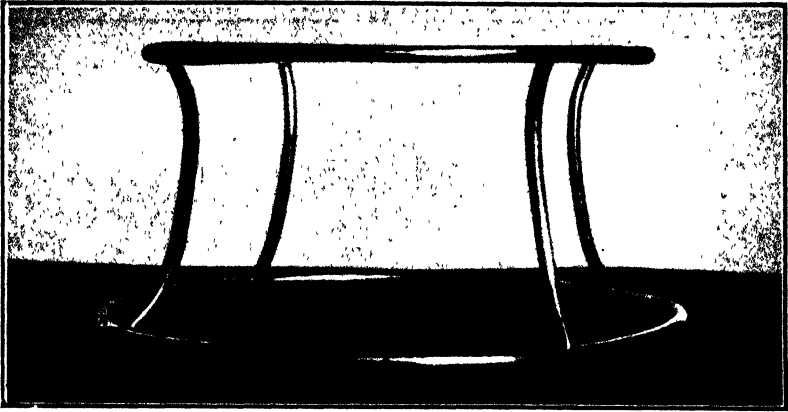


Fig. 1.—Silver wire Dish Ring, Dublin, about 1780 (278-02).

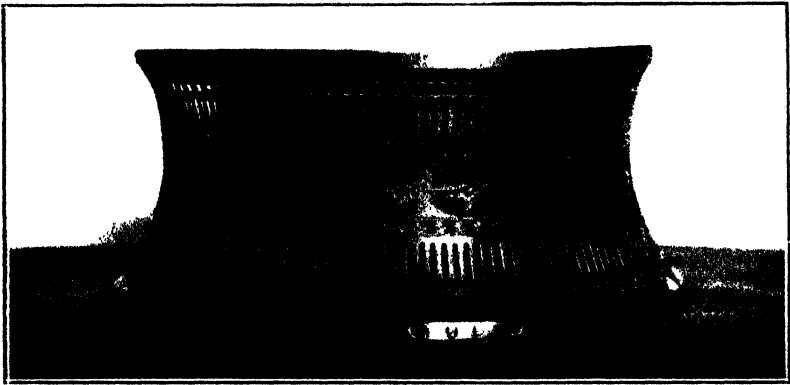
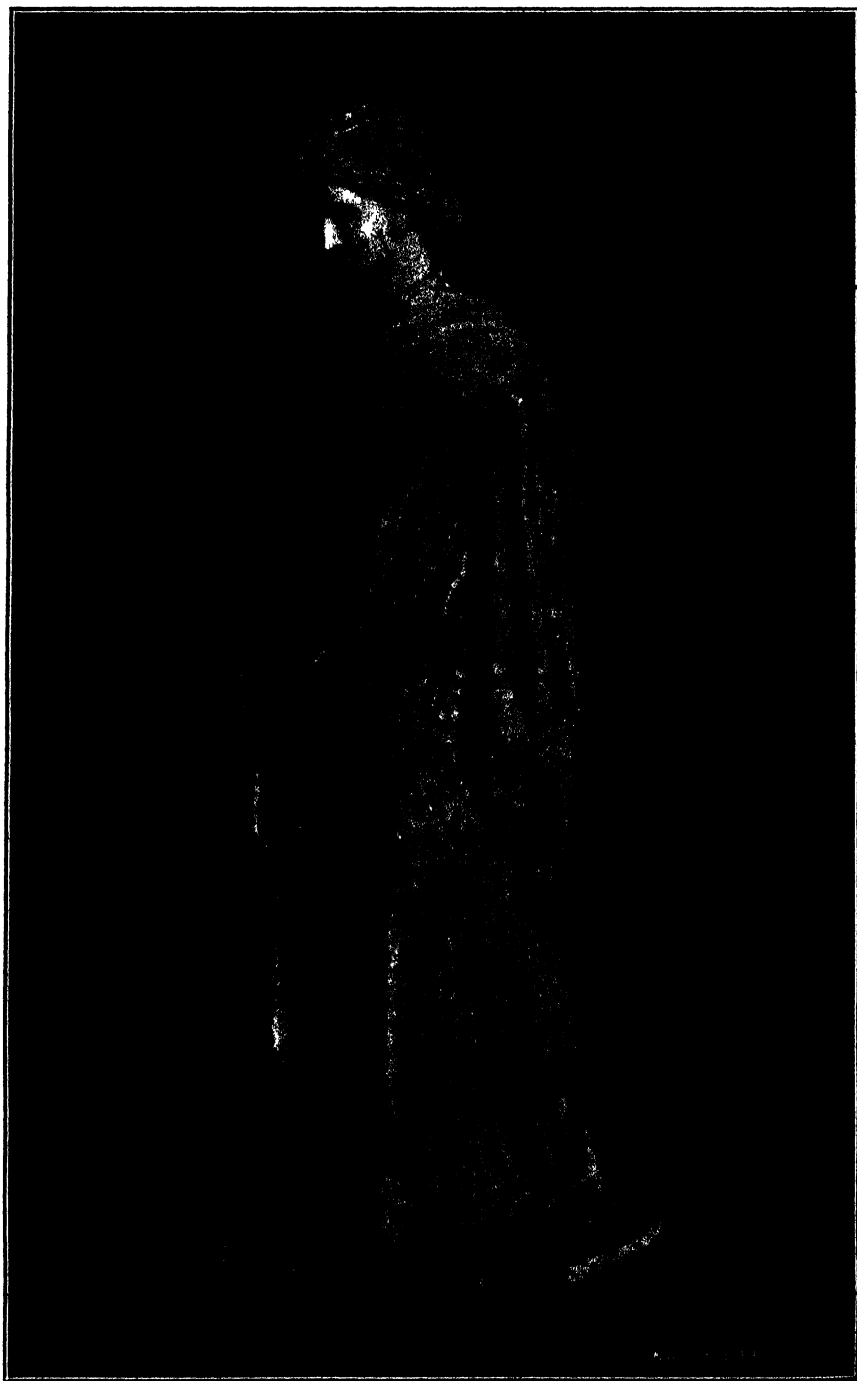


Fig. 2.—Silver pierced and "bright cut" "Dish Ring," Dublin, 1788 (277-06).



Fig. 3.—Silver pierced and repoussé Dish Ring, Dublin, about 1770 (48-88).

**SCIENCE AND ART MUSEUM—GREEK TERRA-COTTA
FIGURES.**



Tanagra Statuette (31-86).

and, lastly, those formed of two rings of plain cylindrical or square twisted wire, connected by three or four supports of similar wire. The pierced and repoussé rings appear to be the earlier form, and are generally heavier than the later ones, usually weighing from about twelve to sixteen ounces, while the "bright cut" and wire patterns are generally after about 1780, and sometimes weigh only seven or eight ounces.

Dish Rings were made in large numbers in Sheffield plated ware, probably mostly to the order and from the designs of Irish goldsmiths. None of these plated rings appear to have been made in Ireland, in fact it is almost certain that no fused plate was manufactured in the country, with the exception of a little for buttons, etc., made by John Lloyd, button-maker, of Harold's Cross, who, in 1784, obtained a premium valued at about £30 from the Royal Dublin Society for plated metal. Unlike the Irish silver ones, the Sheffield plated rings are often oval, while the wire ones sometimes have one rim oval and the other circular, so that they could be used for either oval or round dishes. The Sheffield plated rings often had a lamp in the centre for use with dishes which required to be kept hot.

These plated rings are almost always copies of the Irish pierced and "bright cut" and wire types. There are examples in the National Museum of the different types, both in silver and in Sheffield plated ware. Three Irish Dish Rings are illustrated showing the various types:-

Fig. 1.—Formed of cylindrical wire. Dublin, about 1780 (278-02).

Fig. 2.—Pierced, and decorated with "bright cutting" Dublin, 1788 (277-06).

Fig. 3.—Pierced, and repoussé with figures, birds, foliage and scrolls. Dublin, about 1770 (48-88).

D. W.

GREEK TERRA-COTTA FIGURES.

Among the most attractive objects in a collection of Greek antiquities are the small pottery figures known as Tanagra statuettes. The name is due to the town in Boeotia, where they were first found in large quantities. Similar figures are found in Asia Minor, Egypt, South Italy, and elsewhere. They are attributed to the Hellenistic age (350 to 200 B.C.). They have been found chiefly in tombs, and seem to have been used as offerings to the dead, or to the gods. Their appearance, however, shows that they were also intended as household ornaments.

They were made of clay, shaped in moulds, and baked; then coated with a white slip, and coloured. The colouring has mostly disappeared; but their graceful forms, in plain red pottery, are none the less attractive to modern eyes.

The figure illustrated (31-86) is a good example of Tanagra work, and was made probably between 330 and 300 B.C. It is $9\frac{1}{4}$ inches high, and has traces of pink paint on the dress and face, of red upon the lips, of brown on the eyebrows, eyelashes and pupils, and of white on the eyeballs.

G. R. S.

SOME RECENT ADDITIONS TO THE ART AND INDUSTRIAL COLLECTIONS.

PURCHASES:

Pottery, porcelain, and Irish silver plate from Sir William Thornley Stoker's sale.

Collection of "Blue and White" Chinese porcelain tiles (20).

A Collection of Nailsea (Bristol) glass (18 pieces).

DONATION:

Collection of Arms, etc., collected in the district between Bangala, Stanley Falls, Aruwini, and Lomami, in 1889-90-91 by Dr. C. E. Gardiner, L.R.C.S.I., Congo Star Decoration. (Given by Sir Wm. Thornley Stoker, M.D.)

LOANS:

Collection of Chinese porcelain, etc. (36 pieces). J. T. Andrews, Esq., B.L.

Collection of porcelain and pottery, various European (17). Montagu Yeats Brown, Esq.

Collection of Mexican antiquities (95). W. J. Campbell, Esq., B.E.

Collection of English pottery figures (280). Frank Falkner, Esq.

Early Chelsea Derby porcelain bowl. Lucius O'Callaghan, Esq.

Collection of snuff-boxes, patch-boxes, &c., of Battersea and Bilston enamel (87). Captain Gordon Hutchinson.

Bijouterie: Silver caddy spoons, silver teaspoons, étuis, tooth-pick cases, patch-boxes, &c. (177). Miss Bastable.

Collection of silver plate (86). John Mulhall, Esq.

Collection of ethnographical specimens from West Africa (96). Lt.-Col. Davidson-Houston.

NOTES FROM THE IRISH ANTIQUITIES SECTION.

Research work is being steadily carried on in the Irish Antiquities Section, and a number of objects have been described. Among these may be mentioned the iron spear heads belonging to the Celtic Iron Age or La Tène period, which were described by Mr. Coffey in a paper on the "Intercourse of Gaul with Ireland before the first century" in the *Proceedings of the Royal Irish Academy*, Vol. XXVIII., Section C. In the same volume the large find of Scandinavian objects from the Norse cemetery at Island Bridge and Kilmainham have been all fully described, for the first time, with numerous illustrations and a coloured plate showing the decorated sword hilts. (Coffey and Armstrong, *Proceedings Royal Irish Academy*, Vol. XXVIII.). The objects of this find are now all arranged and labelled. It is the largest collective find of Scandinavian objects made in Ireland, and is of much interest as illustrating the material culture of the Norse, who played so important a part in Irish history.

In December, 1910, the Royal Irish Academy deposited in their collection a gold collar or Lunula found at Lisanover, Bawnboy, Co. Cavan. This ornament is in a remarkably fine state of preservation, and will form a handsome addition to the fine series of these objects already in the collection. It was acquired as Treasure Trove, and the finder was very handsomely rewarded. These objects, numbering 37 in all, were described by Mr. Coffey in a fully illustrated paper (*Proceedings Royal Irish Academy*, Vol. XXVII.), giving a complete list of those known, and a map showing their distribution in France, England and Denmark. This has been much commented on by Monsieur Déchelette in his *Manuel d'Archéologie*.

The preservation of certain antiquities, especially those composed of iron or wood, is a great difficulty. During the past year a chemical process for the preservation of iron objects has been successfully carried out in several cases. Unfortunately this treatment cannot be safely used unless the objects are in a fairly sound internal condition, and with weak objects a long and tedious process, involving many weeks' saturation in different waters, is necessary.

Wooden objects obtained from the bogs also require most careful treatment, otherwise they split, shrink and fall to pieces. A so-called "Otter trap" of oak, recently found in Co. Galway, has been successfully preserved by a long soaking in a mixture of oils and subsequent careful drying. It is most important that all wooden objects found in bogs should not be allowed to dry until they can be properly treated; this often involves some six months' careful treatment and constant watching.

E. C. R. A.

MINERALOGY AND PHYSICAL GEOLOGY.

In the last few months, the collection of Irish Minerals, instituted nearly a century ago by the Royal Dublin Society, has received additional space in the area surrounding the raised model of Ireland. Some counties, mostly those in the limestone plain, remain practically unrepresented; but the series in other instances have been enlarged by gifts from places where prospecting for mines has been going on. The collection is by no means merely a commercial one, but aims at exhibiting every mineral that may arouse interest in the minds of visitors from the various counties.

Among recent additions to the general collection of minerals may be mentioned several from the newly-developed lands of Rhodesia, including *gold*. The very handsome green sulphate of copper and sodium *Kronhite*, from Chile, is now represented. *Euclase*, which was known in 1785, and named by the famous Abbé Haüy in 1792, has remained extremely rare. It is a gem-like beryllium-aluminium silicate, and a Bohemian specimen has at last been added to the National collections. The newly discovered *Hollandite* from the Central Provinces of India is of interest as being probably the crystallised form of a well-known oxide of manganese, *Psilomelane*, which hitherto has only been known, in Co. Cork and elsewhere, in a massive form.

A coloured model of the volcanic region of the Campi Phlegræi west of Naples, by Signore Aureli of Rome, has been acquired. It shows the numerous crater-rings studied by Sir William Hamilton in the 18th century, which prove that the Vesuvian region was one of considerable volcanic activity in prehistoric times. It is remarkable that Vesuvius itself was not known to the Romans as a volcano until it suddenly renewed its activity in 79 A.D. The alarming but brief eruption of Monte Nuovo occurred in the Campi Phlegræi in 1538, and the well-known sulphur-jet or solfatara is still fuming behind Pozzuoli.

G. A. J. C.

OFFICIAL DOCUMENTS.

I.—AGRICULTURE.

ROYAL COLLEGE OF SCIENCE, DUBLIN.
SESSION 1911-12.

SCHOLARSHIPS IN AGRICULTURE, HORTICULTURE, FORESTRY, AND CREAMERY MANAGEMENT.

A limited number of scholarships will be offered in 1911 for competition among young men in Ireland who desire to acquire a thorough knowledge of Technical Agriculture, and, in addition, one or more scholarships will be provided for students who intend to specialise in either Horticulture, Forestry, or Creamery Management. Each scholarship includes—(1) free admission to the first year's course of instruction in the College, (2) one third-class railway fare to Dublin at the beginning of the session, and one-third class fare from Dublin at the end of the session, and (3) either of the following at the option of the Department—(a) a maintenance allowance of one guinea per week while in attendance at the Royal College of Science or elsewhere, as the Department may decide; or (b) free board and residence at one of the Department's institutions; in the latter case a small grant will be made to each student towards the cost of books and apparatus.

A scholarship is tenable for one year, but selected candidates must undergo a probationary course of one term of about three months. If satisfactory progress be made by the holder, the scholarship may be renewed for a second, for a third, and, in certain circumstances, even for a fourth year, to enable the student to complete his course.

The Department do not undertake to employ, or find employment for, students at the close of the period of training.

Holders of these scholarships will be subject to the regulations made from time to time at the Royal College of Science, and will be required to devote their whole time to the course of study prescribed for them by the Department.

Candidates, who should be between 18 and 30 years of age on the 1st September, 1911, must make application on a form, which may be obtained from the Secretary, Department of Agriculture and Technical Instruction, Dublin, or the Registrar, Royal College of Science, Dublin, after the 1st February, 1911, and which should be returned not later than the 3rd August, 1911.

Candidates must have been born in Ireland or have been resident in Ireland for three years immediately prior to the 1st September, 1911.

The examination will take place in Dublin, on the 16th, 17th, and 18th August, 1911. No expenses in connexion with attendance at this examination will be allowed.

Candidates will be tested in the following:—

A.—ENGLISH.

- (1) Composition—to be tested by an essay.
- (2) Grammar—Etymology, and the principles of Syntax.
- (3) Literature—the following works:—(a) Morley, "Burke" (English Men of Letters Series); (b) Shakespeare, "The Merchant of Venice."

B.—One of the following:—

LATIN;
IRISH;
FRENCH;
GERMAN.

In these languages the papers will comprise—

- (1) Passages for translation from the following texts:—
Latin—Cæsar, "De Bello Gallico" (Books II. and III.).
Irish—*p. Ó Conaige*, "Dóna Márcuir Dís."
French—Souvestre "Un philosophe sous les toits."
German—Hauff, "Das Wirthshaus im Spessart."
- (2) Easy passages for translation into English from other texts.
- (3) Questions in Grammar—Accidence and the principal rules of Syntax.
- (4) Short sentences for translation from English.

C.—MATHEMATICS.

- (1) Arithmetic—up to Simple Interest inclusive with Mensuration of simple plane figures and rectangular solids.
- (2) Algebra—to quadratic equations inclusive.
- (3) Plane Geometry—to be tested partly by questions requiring formal proofs of propositions from Euclid I.-III., and easy exercises thereon, and partly by practical problems to be solved by compasses and scale of equal parts.

D.—Practical experience of one of the following:—

AGRICULTURE;
HORTICULTURE;
FORESTRY;
DAIRYING AND CREAMERY MANAGEMENT.

Each applicant must have had substantial experience of practical work in connexion with farming, gardening, the management of woodlands or dairying and creamery management. The examination may be written, oral and practical. The subjects will include all the ordinary work of farms, gardens, woods, or dairies, as practised in Ireland.

N.B.—On no account will a scholarship be awarded to a candidate who fails to attain a high standard in the subject he selects for this portion of the examination; while excellence in that subject will be taken into consideration in case of deficiency in one or more of the others.

E.—ABILITY TO IMPART INSTRUCTION:—

Gauged by the style of the answers in both the written and the oral examinations.

Candidates who are qualified for scholarships by their examination on the foregoing subjects will be required to submit to an examination by a medical officer appointed by the Department. A scholarship will not be awarded in any case where the candidate is certified to be physically unfit to undertake the prescribed course of studies.

Last date for receiving applications, 3rd August, 1911.

Scheme No. 22.

VETERINARY DISPENSARIES IN CONGESTED DISTRICTS.

1. The Department will establish a limited number of Veterinary Dispensaries in the poorer parts of the nine congested counties. For this purpose they propose to subsidise a number of Veterinary Surgeons, whose headquarters are within a reasonable distance of the districts to be benefited.

2. In fixing the subsidy to be paid Veterinary Surgeons for their services the Department will take into consideration the poverty of the district, the difficulties of travelling, and whether the district is or is not regularly visited by the Veterinary Surgeon in the ordinary course of his practice.

3. Subsidised Veterinary Surgeons will be required to give advice to all *bona fide* farmers under £10 valuation and resident in congested districts who seek it either at a dispensary or at the Veterinary Surgeon's headquarters.

4. The term "*bona fide* farmer" is to be understood to mean a person who derives his means of living mainly from the cultivation of his holding. Each applicant must, if requested to do so, produce evidence that his total valuation does not exceed £10.

5. Subsidised Veterinary Surgeons will be required to attend at certain centres at least fortnightly, or as may be arranged, on days and at hours fixed by the Department, and advertised by them in the district.

6. Subsidised Veterinary Surgeons must also attend when required at the residence of farmers entitled to the benefits of this scheme.

7. The following scale of fees will apply:—

Advice at headquarters or dispensary, 1/- per case.

Simple operations at headquarters, or dispensary, 1/- per case.

Severe operations at headquarters, or dispensary, 2/6 per case for persons whose valuation is £5 or under, and 5/- per case for persons whose valuation exceeds £5 but does not exceed £10.

Inoculation at headquarters, or dispensary, 1/- per case.

Attendance at farmer's residence, 1/- per £ of valuation, provided the minimum fee is not less than 2/6.

Double fees may be charged after sunset.

8. Medicines supplied by the Veterinary Surgeon to persons entitled to the benefits of this scheme shall be charged for in addition at reasonable prices.

9. Subsidised Veterinary Surgeons will be required to keep at their headquarters and at each dispensary a record of the number and the nature of the cases treated under this scheme, the fees charged therefor, and the amount charged for any medicines supplied.

10. The Department reserve the right to ask each Veterinary Surgeon subsidised under this scheme to give public lectures on veterinary hygiene at a fee to be arranged.

11. The work of each subsidised officer under this scheme shall be subject to inspection by the Department from time to time.

12. The subsidy will be paid at the end of each quarter.

II.—TECHNICAL INSTRUCTION.

FORM S. 2.

METROPOLITAN SCHOOL OF ART, DUBLIN.

TEACHERSHIPS-IN-TRAINING, 1911.

The Department will offer for competition, at the beginning of the Session 1911-12, three Teacherships-in-Training tenable at the Metropolitan School of Art, Dublin. One will be open to competition amongst male candidates only, and one amongst female candidates only; the third will be open to competition amongst both male and female candidates.

The object of the Teacherships-in-Training is to encourage capable Art students to undertake such a course of training as will enable them to become Art Teachers.

The Teacherships-in-Training will entitle the holders to free admission to all the day and evening classes at the Metropolitan School of Art for the Session 1911-12; a maintenance allowance of 21s. per week during the Session (about forty weeks); and third-class railway fare for one journey to and from Dublin.

The Teacherships will be awarded partly as the result of an examination, and partly for works submitted according to the conditions stated below.

The examination will be confined to Art subjects, and will be held at the Metropolitan School of Art, Dublin, on Tuesday, Wednesday, and Thursday, the 27th, 28th, and 29th June, 1911.

Candidates must themselves bear any expenses incurred by them in connection with attendance at the examination.

Candidates who have held Scholarships at the Metropolitan School of Art extending over more than one School Session will not be eligible for the award of Teacherships-in-Training.

Teacherships will not be awarded to candidates who do not show in the course of the examination that they are capable of taking full advantage of the instruction provided at the Metropolitan School of Art, and in particular, candidates with physical defects of voice, sight, or hearing, will not be regarded as eligible. In awarding the Teacherships preference will be given to candidates who possess the Art Class Teachers' Certificate (Board of Education), or the Irish Secondary Teachers' Honours Drawing Certificate.

The award will be made on the following conditions:—

(1.) Candidates must be not less than eighteen and not more than thirty years of age on the 1st September, 1911. The Department may allow a modification of this rule in special cases.

(2.) Successful candidates will be required to furnish a medical certificate of health, an authenticated copy of certificate of birth, and satisfactory testimonials from two responsible persons.

(3.) Candidates must satisfy the Department that they have a good general education.

(4.) Candidates must have been born in Ireland, or have been resident in Ireland for three years prior to the 1st September, 1911.

(5.) Successful candidates will be required to prepare, in conjunction with the Headmaster of the School, a scheme of study; and to submit it for the Department's approval. They will be required to devote their whole time to the work of this scheme; to attend regularly and punctually; and generally to comply with the regulations set out in the programme of the Metropolitan School of Art.

They must be prepared, if required, as part of their training, to undertake such work as teachers as the Headmaster may prescribe.

(6.) The Teacherships may be renewed for a second Session. Renewal will depend upon the ability and application shown by the student during the previous Session, and on the scheme of study proposed by the student when applying for renewal for a second Session.

(7.) The Department reserve the right at any time to determine, without notice, any Teachership upon being satisfied that its continuance is for any reason undesirable.

(8.) The decision of the Department in all questions arising in connection with Teacherships shall be final.

(9.) The Department do not undertake to employ Teachers, nor to find employment for them, at the close of the period of training.

The names of the candidates must be forwarded, on Form S. 3, so as to reach the Offices of the Department not later than the 29TH APRIL, 1911. Applications for forms are not regarded as applications for admission to the examination. Only those candidates who present an official acknowledgment of the form of application will be admitted to the examination room.

Copies of form S. 3 may be obtained, after 1ST FEBRUARY, 1911, upon application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, or to the Registrar, Metropolitan School of Art, Kildare Street, Dublin.

SUBJECTS OF EXAMINATION.

The subjects and time-table of the examination will be:—

First Day, Tuesday, June 27th—

10 a.m. to 2 p.m.—Drawing from the Antique. (100 marks).

3 to 5.30 p.m.—Model Drawing. (50 marks).

Second Day, Wednesday, June 28th—

10 a.m. to 1 p.m.—Drawing in Light and Shade from a Cast. (50 marks).

2 to 6 p.m.—Drawing, or Modelling, Design. (100 marks).

Third Day, Thursday, June 29th—

11 a.m. to 1.30 p.m.—Principles of Ornament. (100 marks).

2.30 to 4.30 p.m.—Perspective. (50 marks).

4.45 to 5.45 p.m.—Drawing on the Blackboard. (50 marks).

For syllabuses of the subject of examination, see "Syllabuses and Lists of Apparatus" of the Board of Education, to be obtained (price 4d.), either directly or through any bookseller, of Mr. E. Ponsonby, 116 Grafton Street, Dublin.

WORKS.

In order to encourage Art students to devote much attention to what should be the primary aim of their higher instruction, namely, the application of their skill, experience, and good taste to works requiring more time and care than the ordinary conditions of an examination room permit, marks, to a maximum of 225, will be awarded for works of the same character as those proposed for the

Irish Secondary Teachers' Honours Drawing Certificate. (*See extract below*).

Works to be submitted for the competition must be delivered at the Metropolitan School of Art, Dublin, on or before Saturday, the 24th June, 1911. They should be addressed, "The Registrar, Metropolitan School of Art, Dublin," and should be specially marked, "Works, Teacherships-in-Training."

Extract from Circular 16 (Irish Secondary Teachers' Drawing Certificate).

WORKS.

(1.) "An imperial sheet of three designs, based on a study in colour of a growing plant. The plant should be drawn from nature simply and directly—not pictorially represented. Such details of the plant as the student may select for the purposes of the designs should, if required, be drawn separately.

"The designs must occupy, in a decorative way, a square, a circle, and an oblong, one being in monochrome, one in two colours, and one in polychrome. At least one of the designs must be executed in body colour or tempera. In each case the plant must be not merely applied to the given space, but treated in accordance with decorative conditions.

(2.) "A modelled study of a flowering plant, with three distinctly different modelled designs for patterns based on it. Each of these three different designs must be suited to the technical requirements of three different processes of manufacture. The process and material for which it is intended must be named on each design. The four studies to be on a panel 30 inches by 22 inches.

(3.) (a.) "A shaded drawing of a complete human figure from the Antique or from Life; or

(b.) "Shaded drawings of a head, hand and foot, from the Life, full size: *completely finished* in pencil, chalk, or brush in monochrome; or

(c.) "A modelled figure in the round, 30 inches high, from the Antique or from Life; or

(d.) "A modelled head, from Life, full size."

FORM S. 41.

SUMMER COURSES OF INSTRUCTION FOR TEACHERS, 1911.

The Department will, as in previous years, conduct Summer courses of instruction for teachers as under:—

A.—Courses beginning Tuesday, 4th July, and closing Friday, 28th July:—

- (1) In Experimental Science, in Laboratory Arts, and in Drawing and Modelling, for Teachers in Day Secondary Schools and in Day and Evening Science and Art Classes.
- (2) In Domestic Economy and in Manual Training (Woodwork), for Teachers in Day Secondary Schools.
- (3) In Office Routine and Business Methods, for Teachers of Elementary Commercial Subjects in Technical Schools.

- (4) In Hygiene and Sick Nursing, and in Housewifery, for Domestic Economy Instructresses.
- (5) In Carrickmacross Lace-making, Crochet Work, Embroidery and Sprigging, for Teachers of these Crafts.

B.—Courses beginning Tuesday, 8th August, and closing Saturday, 2nd September :—

- (6) In Manual Training (Metal Work), in Practical Mathematics and Mechanics, and in Handrailing, for Teachers of Woodworking, etc.
- (7) In Rural Science (including School Gardening), for Teachers in National Schools.

The Courses, except where otherwise stated, will be held in Dublin.

Should the applications exceed the number for which it is proposed to provide accommodation, those applicants will be selected whose admission would appear most likely to prove beneficial. Applications from teachers who have attended short courses of instruction in previous years, and who have been giving instruction in the subjects of those courses during the present session, will have priority of claim for admission to advanced courses.

It is important that teachers should not apply unless they know that they will be able to attend, for much inconvenience, as well as injustice to others, may be entailed by applicants failing to take advantage of admission which may be granted. Failure to attend the course after the invitation has been accepted, will, except in the case of illness, be regarded as an abuse of the privilege; and any teacher failing in this respect will not be admitted to any future course.

Teachers who are selected for, and who attend the courses of instruction regularly and punctually at the specified hours, from the beginning to the end of the course, will, except in the case of those attending the course in Housewifery, be allowed a sum of £3 10s. towards their expenses while living at the centre; and those who travel more than twenty miles to the centre of instruction will be allowed, in addition, Third Class Railway Fare for one return journey from the railway station nearest their school; no car fares or other travelling expenses will, however, be allowed. These allowances will in no case be made until after the conclusion of the courses.

The hours of attendance will, except in the case of the course in Housewifery, be from 10 a.m. to 4 p.m. daily (with an interval of one hour for lunch), except on Saturdays, when the hours of attendance will be from 10 a.m. to 1 p.m. In addition, teachers will be required in the evenings to write out notes, &c.

Teachers desiring to take advantage of these courses must fill up and return the appropriate form of application (*see infra*) as early as convenient, but in any case so as to reach the Offices of the Department not later than the 31st MARCH.

N.B.—These Courses are open only to Teachers who are over eighteen years of age, and, except in the case of the courses in Rural Science (including School Gardening), and Drawing and Modelling, only to Teachers who are engaged (a) by Local Committees of Technical Instruction; or (b) in Schools receiving grants either directly from the Department or under the provisions of an approved local Scheme of Technical Instruction.

DETAILS OF THE COURSES.

I. (a)—EXPERIMENTAL SCIENCE.

There may be eleven courses of instruction in Experimental Science.

Subjects:—Second Year of the Preliminary Course; Third and Fourth Year Courses in Physics, Chemistry, Mechanical Science, Botany, and Physiology and Hygiene.

These Courses will not only cover the subject matter of the syllabuses of the Department's Programme for Day Secondary Schools; but will aim directly at bringing home to Teachers the intentions of the Department as expressed in the prefatory note thereto.

Teachers applying for admission to the courses in the Third and Fourth Year Syllabuses of the Special Courses of the Programme will be expected to have done some reading in the subject of the course for which they apply.

Provisional recognition to teach the subject of the course will be accorded to those Teachers who have punctually and regularly attended and successfully done the class work, as testified by laboratory note books, and by any examination—written, *viva voce*, or practical—which it may be desirable to hold.

Application for admission to these Courses must be made on Form S. 42.

(NOTE.—Summer Courses in the First Year Syllabus and in the Second Year Syllabus of the Preliminary Course will be conducted in alternate years.)

I. (b.)—LABORATORY ARTS.

This Course of instruction will be designed specially for those Teachers who have already successfully attended four Summer Courses in Experimental Science, and is primarily intended to give instruction such as will enable those in charge of laboratories to effect simple repairs to common apparatus, and to design and make new apparatus for lecture illustration, or other special purposes. It will also generally tend to increase the manipulative skill of the Science Teacher.

The Course will include practice in the working of wood, metal, and glass; also instruction in the care and maintenance of tools used in such work. The properties of common materials used in apparatus making will be discussed, in order that teachers may be in a position to draw up correct specifications of special apparatus. Practical work in lantern-slide making, and in the optical projection of apparatus and experiments, will also be undertaken.

The lectures associated with the Course will deal with diagram design and construction; the use of the lantern for demonstration work; the design of laboratories and equipment, etc.

Teachers who have attended punctually and regularly, and in respect of whom the Department receive satisfactory reports, will receive a certificate of satisfactory attendance. Satisfactory attendance at the course in Laboratory Arts will be accepted in lieu of

attendance at a fifth Summer Course under the conditions of Section I. (2) of Circular 23, except in the case of Teachers taking out the Certificate in Physics.

This Course will not be held unless there are at least twenty qualified applicants. Should the Department be unable to arrange for the course this year, they will be prepared to extend the temporary recognition of those teachers whose recognition as Teachers of Experimental Science beyond the 31st July, 1911, is dependent upon their successfully attending a fifth Summer Course.

Application for admission to this Course must be made on Form S 42.

I. (c.)—DRAWING AND MODELLING.

This Course is intended primarily for the further training of teachers who hold the Irish Secondary Teachers' Drawing Certificate, or higher certificates. The Department will, however, admit a limited number of teachers in Secondary Schools and Art students who wish to become teachers of drawing, but who do not at present possess qualifications as such recognised by the Department. Applicants must show that they have received some previous training in Art subjects, and preference will be given to those who have already obtained some of the successes required for the Irish Secondary Teachers' Drawing Certificate.

Persons residing, or teaching in Schools, within ten miles of Dublin are not eligible for admission to this Course.

The Department do not now grant temporary recognition as Teachers of Drawing in Day Secondary Schools as the result of attendance at the Summer Courses in this subject.

Application for admission to this Course must be made on Form S 147.

II. (a.)—DOMESTIC ECONOMY.

This Course will be arranged for Teachers who have already obtained provisional recognition to give instruction in the First and Second Year Syllabuses of the Preliminary Course of Experimental Science, and who desire to obtain recognition as teachers of Domestic Economy in Day Secondary Schools. The course of instruction will include Cookery, the elements of Physiology and Hygiene, and Home Sewing.

Recognition to teach Domestic Economy in Day Secondary Schools during the Session 1911-12 will be given to those teachers who have punctually and regularly attended, and successfully done the class work, as testified by note books and by any examination—written, *viva voce*, or practical—which it may be desirable to hold. Teachers who successfully attend three Summer Courses in Domestic Economy, under the conditions referred to above, and who teach this subject for two complete sessions to the satisfaction of the Department's Inspectors, will be recognised as qualified to give instruction, in Day Secondary Schools, in the Preliminary Course in Experimental Science of the Department's Programme and in the Syllabuses of Domestic Economy. (See Circular 25.)

Application for admission to this Course must be made on Form S 42.

II. (b.)—MANUAL INSTRUCTION (WOODWORK).

The Course of Manual work will include instruction in Drawing, in addition to practical instruction in the use of Woodworking tools, and will provide for the further training of Teachers who at present teach this subject in Day Secondary Schools, or who will be so engaged during the forthcoming session. Examinations will be held at the conclusion of the Course, and Teachers who succeed in passing these examinations will, for the present, be accepted as qualified to give instruction in the subject under the Department's Regulations for Day Secondary Schools, subject to the conditions of Circular 24.

When the selection of teachers to attend this course is being made, preference will be given to applicants who have obtained a success at the Board of Education's examination in Practical Plane and Solid Geometry.

Application for admission to this Course must be made on Form S 147.

III.—OFFICE ROUTINE AND BUSINESS METHODS.

This Course is intended for Teachers in Technical Schools who are giving instruction in such subjects as Shorthand, Commercial Correspondence, Commercial Arithmetic, and Book-keeping. The course will include instruction in Business Methods and the Keeping of Accounts. It will also include the routine methods and operations common in office work. Reference will be made to the equipment required for classes in Elementary Commercial subjects, and to the methods of conducting such classes. An examination will be held at the close of the Course.

Applications for admission to this Course must be made on Form S 43.

IV. (a.)—HYGIENE AND SICK NURSING.

This Course is intended for Teachers of Domestic Economy at present engaged under Local Authorities.

The object of the Course is to provide facilities for these teachers to obtain further practical knowledge of the laws of health, and of home nursing, so as to enable them to introduce into their Courses simple and well-directed instruction in these subjects.

The Course will include only as much Human Physiology as is necessary for the proper understanding of the laws of health, and will deal largely with rural and personal hygiene, and with the care of the young and of the sick in their own homes. Instructions in First Aid to the Injured will also form part of the Course.

The instruction will include practical work, and an examination will be held at the close of the Course.

Applications for admission to this Course must be made on Form S 146.

IV. (b.)—HOUSEWIFERY.

This Course is intended for Teachers of Domestic Economy, at present engaged under Local Authorities, who do not hold a special certificate in Housewifery, or who were admitted to training at the Irish Training School of Domestic Economy previously to the 1st August, 1905.

The Course will include instruction regarding the general management of a house; the care and cleaning of furniture, etc.; the making and mending of house linen; the care of clothing; and in the making and use of various cleaning and polishing agents, etc. An examination will be held at the close of the Course.

This Course will be held at the Irish Training School of Domestic Economy, St. Kevin's Park, Kilmacud, Stillorgan, Co. Dublin, and Teachers attending will be required to conform to the general rules of the School. They will reside at the School, board and residence being provided free. In addition, Teachers travelling more than twenty miles to the School will be allowed third-class railway fare for one return journey between the railway station nearest to the centre at which they are engaged, and Blackrock or Dundrum, the stations nearest to the Training School. Car fares and other travelling or maintenance expenses will not be allowed.

Applications for admission to this Course must be made on Form S 146.

V.—COURSE OF INSTRUCTION FOR TEACHERS OF CARRICKMACROSS LACE-MAKING, CROCHET WORK, EMBROIDERY, AND SPRIGGING.

The object of the present Course is to improve existing kinds of work, and not to introduce new forms. The instruction will be confined to Carrickmacross Lace-making, Crochet Work (Clones and Raised), Crochet Point, Embroidery, and Sprigging.

The lessons on each of these subjects will include instruction in technique, the use of suitable materials, the preparation of working tracings, and of drawings from rubbings of crochet. In the case of those capable of profiting by such form of instruction, practice in Design will also be afforded. Special instruction will be given in the artistic arrangement of traditional details ordinarily used by crochet workers. Exercises will be given in which the actual units will be employed, and drawings will be made from such arrangements as prove satisfactory: these exercises will form an important part of the Course. Instruction will also be given in the keeping of the accounts of Industries Classes.

Certificates will be awarded at the close of the Course to those who have attended regularly and worked well, and whose work is of a sufficiently high standard, as shown by the specimens produced during the class-lessons, and by any tests of a written or practical character which it may be considered advisable to apply.

This Course will probably be conducted at the Crawford Municipal School of Art, Cork.

Application for admission to the Course must be made on Form S 140.

VI. (a.)—MANUAL TRAINING (METAL WORK).

This Course is intended for the further training of Manual Instructors who are at present under engagement to Local Committees of Technical Instruction. Examinations will be held at the close of the Course, and Instructors who attend satisfactorily and pass these examinations will be granted provisional certificates of recognition as teachers of Manual Training (Metal Work) under the conditions of Circular 24.

Applications for admission to this Course must be made on Form S 147.

VI. (b).—PRACTICAL MATHEMATICS AND MECHANICS.

This Course is also intended for the further training of Manual Instructors. A certificate of satisfactory attendance and progress will be issued to those who are favourably reported upon by the Instructor-in-charge; but it is not the intention of the Department to issue Teachers' Certificates on the results of the Course. Instructors attending the course will be expected to sit for the Board of Education's Local Examinations, to be held in May, 1912.

Application for admission to this Course must be made on Form S 147.

VI. (c).—HANDRAILING.

Admission to this Course will be limited to Teachers of Wood-working, etc., who hold the City and Guilds of London Honours Certificate in Carpentry and Joinery. A certificate of satisfactory attendance and progress will be issued to those who are favourably reported upon by the Instructor-in-charge, and who pass a satisfactory examination at the close of the Course.

This Course will probably be held in the Municipal Technical Institute, Belfast.

Application for admission to this Course must be made on Form S 147.

VII.—RURAL SCIENCE (INCLUDING SCHOOL GARDENING).

The Department have drawn up a Syllabus in Rural Science (including School Gardening) suitable for introduction into the curriculum of rural National Schools, and have undertaken to make provision, as far as possible, for the training of National School Teachers in this subject. Further particulars on this subject will be furnished upon application.

Courses of instruction in the First and Second Year Syllabus of the subject will be held in August, 1911, at the Royal College of Science and School Gardens in the neighbourhood. Except in special circumstances, only those teachers will be admitted to these courses who have been recognised by the Commissioners of National Education as qualified to teach the syllabus of Elementary Experimental Science and Object Lessons of the Commissioners' Programme. Only those teachers who attended the Summer Course in School Gardening held in 1909, and those who successfully attended the Summer Course in Rural Science (including School Gardening), held in 1910, will be eligible for admission to the course in the Second Year Syllabus.

Teachers who attend the courses punctually and regularly and pass the examinations, written and practical, held at the close of the courses, will be recognised by the Commissioners of National Education as qualified to give instruction in National Schools in the subject of the course attended. Teachers who have successfully attended courses in both the First and Second Year Syllabuses will be granted a Certificate of proficiency in the subject.

Application for admission to these Courses must be made on Form S 297.

SUMMER COURSES OF INSTRUCTION TO MEMBERS OF ENCLOSED RELIGIOUS ORDERS, 1911.

The Department will, during the months of July and August, conduct Summer Courses of Instruction for Teachers of Experimental Science, Drawing, and Domestic Economy.

In all cases in which the Department grant the services of expert Instructors, compliance with the following conditions will be required:—

(1.) That the Convent authorities provide accommodation, and all necessary apparatus and materials required for the Courses.

(2.) That arrangements will be made, as far as possible, for the admission of Teachers from other Convents, who may apply for a course of instruction at the centre.

(3.) That none but members of Religious Orders, who are actually engaged in teaching in Day Secondary Schools in receipt of grants from the Department, will be admitted.

(4.) That all expenses incurred by Teachers attending the courses shall be defrayed by the authorities of the Convents in which they teach.

The courses will, as a rule, begin on the 4th July and close on the 28th July; but, should these dates be not suitable, the Department will be prepared to consider applications for courses to begin on the 8th August and close on the 2nd September.

The hours of attendance will be from 10 a.m. to 4 p.m. daily (with an interval of one hour for lunch), except on Saturdays, when the hours of attendance will be from 10 a.m. to 1 p.m. In addition, Teachers will be required in the evenings to write out notes, etc. The Department are prepared to consider applications for alternative arrangements provided they allow of an equal period of teaching.

Teachers who wish to attend the courses must fill in Form S 142, and forward it, through the Superioress of the Convent at which it is desired that they should attend, so as to reach the Offices of the Department not later than the 28th February.

DETAILS OF THE COURSES.

EXPERIMENTAL SCIENCE.

The subjects of the courses of instruction will be:—First and Second Years of the Preliminary Course; Third and Fourth Year Courses in Physics, Chemistry, Botany, and Physiology and Hygiene.

These courses will not only cover the subject matter of the syllabuses of the Department's Programme for Day Secondary Schools, but will aim directly at bringing home to Teachers the intentions of the Department as expressed in the prefatory note thereto.

Provisional recognition to teach the subject of the course will be accorded to those Teachers who have punctually and regularly

attended and successfully done the class work, as testified by laboratory note books, and by any examination—written, *viva voce*, or practical—which it may be desirable to hold.

(NOTE.—Applications from any Convent for admission to courses in the First Year Syllabus and in the Second Year Syllabus of the Preliminary Course will be entertained only in alternate years.)

DRAWING AND MODELLING.

This Course is intended primarily for the further training of teachers who hold the Irish Secondary Teachers' Drawing Certificate, or higher certificates. The Department will, however, admit a limited number of teachers who wish to become teachers of drawing, but who do not at present possess qualifications as such recognised by the Department. Applicants must show that they have received some previous training in Art subjects, and preference will be given to those who have already obtained some of the successes required for the Irish Secondary Teachers' Drawing Certificate.

The Department do not grant temporary recognition as Teachers of Drawing in Day Secondary Schools as the result of attendance at Summer Courses in this Subject.

DOMESTIC ECONOMY.

This Course will be arranged for Teachers who have already obtained provisional recognition to give instruction in the First and Second Year Syllabuses of the Preliminary Course of Experimental Science, and who desire to obtain recognition as teachers of Domestic Economy in Day Secondary Schools. The course of instruction will include Cookery, the elements of Physiology and Hygiene, and Home Sewing.

Recognition to teach Domestic Economy in Day Secondary Schools during the Session 1911-12 will be given to those teachers who have punctually and regularly attended, and successfully done the class work, as testified by note books and by any examination—written, *viva voce*, or practical—which it may be desirable to hold. Teachers who successfully attend three Summer Courses in Domestic Economy, under the conditions referred to above, and who teach this subject for two complete sessions to the satisfaction of the Department's Inspectors, will be recognised as qualified to give instruction, in Day Secondary Schools, in the Preliminary Course of the Department's Programme of Experimental Science and in the Syllabuses of Domestic Economy. (*See Circular 25.*)

FORM S. 125.

Local Examinations.

LOCAL SCIENCE AND ART EXAMINATIONS, 1911.

Regulations for the conduct of the Local Examinations in subjects of Science and Art held by the Department of Agriculture and Technical Instruction for Ireland on behalf of the Board of Education.

1. The examinations will be held in May and June. The dates on which the examinations in the various subjects will be held are specified in the Examination Time Table, published separately.

When examinations are held in several subjects on the same evening at the same time, candidates may not take more than one of the subjects. Candidates may not present themselves for examination in more than one stage, or section of a stage, of any subject in the same year except in (a) Mathematics, in which subject they may take one of the stages, or Honours, of each of the two Divisions in which the examination in this subject is arranged, (b) Agricultural Science and Rural Economy, in which subject they may take the examination in one of Sections A, B, and C, and one of the Sections D, E and F of Stage 2, and (c) Applied Mechanics, in which subject they may take the examination in Stage 2 or Stage 3 of both divisions, viz., (a) Materials and Structures, and (b) Machines and Hydraulics. A candidate taking Stage 1 of Subject VIII. may not take, in the same year, any of the sub-divisions of this subject. A candidate taking Stage 1, or Honours, of Subject VII. may not take, in the same year, either sub-division of this subject.

2. Examinations in Practical Chemistry (Subjects Xp. and XIp.), and in Practical Metallurgy (Subject XIXp.) are held only in laboratories equipped in accordance with the requirements appended to the Board of Education's Syllabuses for these subjects. Where the number of candidates for examination working at the same time exceeds the number for which the laboratory is approved, the candidates may be examined in divisions. Not more than two such divisions will be allowed, and the number of candidates in each division working at the same time must not exceed the number for which the laboratory is approved.

Practical examinations for candidates in Honours in certain subjects may be held at South Kensington, or at some other centre, in addition to a written examination. Such practical examinations will be held as early as possible in June or July. Candidates who are instructed to attend these examinations at South Kensington or any other centre, receive a subsistence allowance of 7s. 6d. a night while required to be absent from home, and third class railway fare; but no cab or omnibus fares are allowed.

3. The grades of success at the Examinations are "first class" and "second class."

Exceptions.—(1) In Section I. of Stage 1 of Science Subjects Vp., XV., and XXIII. there is only one grade of success, viz.: "pass."

(2) In the Art subjects of Drawing and Modelling from Life and Architectural Design there is a further grade of success, viz.: "excellent."

4. Applications for examination papers in Stage 1 of Science Subjects, and in Stage 1 of Design cannot be considered unless the application is accompanied by a sum of 1s. 6d. for each such paper asked for. For papers in Stage 1 of Practical Chemistry or Practical Metallurgy the fee will be 2s. 6d. per paper. No fee is exigible in respect of examinations in subjects of Art other than that in Stage 1 of Design.

The number of papers requisitioned cannot be subsequently varied, and no part of the remittance is returnable.

The remittance of the fee for papers in Stage 1 must be made by Bank Draft, Cheque, or Postal Order, made payable to "The Accountant, Department of Agriculture and Technical Instruction for Ireland." Stamps cannot be accepted.

5. Managers who wish their Schools to be made examination centres must make application to the Department not later than the 19th January, on Form S. 101.

6. **External candidates** (*i.e.*, candidates who are not students of a school which is to be an examination centre) must apply not later than the **11th March** to the Managers of a School where examinations in the subjects required will be held. A list of the centres at which examinations will probably be held will be issued, on Form S. 114, early in **February**.

7. Managers may charge external candidates a fee not exceeding 2s. 6d. for each morning, afternoon, or evening for which they register their names for examination. The admission of an external candidate to an examination in Practical Chemistry (Subject Xp. or XIp.), Practical Metallurgy (Subject XIXb.), Drawing from Life, Architectural Design, or Modelling, is not obligatory, and the above-mentioned limitation to the fee will not apply in the case of admission to the examinations in these subjects. These fees are additional to the fees payable to the Department.

8. Where managers of different institutions have classes in the same subject under their control they must arrange, where possible, for a conjoint examination of these classes in such manner that an unnecessary number of rooms may not be in use.

9. A separate examination will not, as a rule, be held where the number of candidates to be presented in any one subject is less than four, but the Department will be prepared, in exceptional circumstances, to approve of examinations being held for a fewer number of candidates, if special written application, setting forth the circumstances, is made before the **28th February**.

10. The accommodation provided should be as follows:—

(a.) For examinations in all subjects of Science and in all subjects of Art, except those mentioned in (b), the accommodation should be such as to allow of the candidates being seated not less than five feet apart from centre to centre. For examinations in subjects of Science it is desirable that rooms with level floors and without galleries should be used.

(b.) At examinations in the following subjects of Art:—Freehand Drawing in Outline, Model Drawing, Drawing in Light and Shade from a Cast, Drawing and Modelling from the Antique, Drawing and Modelling from Life, Modelling the Head from Life, and Painting from Still Life, candidates may be placed so as to be not less than two feet six inches apart from centre to centre.

11. Managers or their representatives must provide (for use in the examination in those subjects in which they are respectively required), ink, pens, ruled foolscap paper, paper fasteners, tracing paper, and the necessary materials, such as stands, nails, etc., required for hanging up the casts for examination purposes in Drawing in Light and Shade and Modelling from the Antique.

12. Application for examination papers must be made to the Department, on Form S. 102, not later than the **18th March**. On this form the Managers will also be required to propose arrangements for the examination.

13. The Managers will nominate on Form S. 107, certain persons prepared to superintend the examinations. The superintendents

may either be voluntary superintendents, or they may be remunerated by the Managers, after notice to the Department, at a rate not exceeding 2s. 6d. per hour of attendance necessary; the Department would not, however, approve of Managers making payments for such services to members of their own body. Candidates for examinations, their relatives, their teachers, or other persons who have a direct interest in the success of any candidate are ineligible to act as superintendents of examinations. Managers are held entirely responsible for the presence of superintendents to the number required at each examination; otherwise the examination may be held to be void. Copies of Form S. 107 will be issued in due course to the Managers of all centres whose applications (on Form S. 102) for examination papers have been accepted.

14. The examination papers and the materials supplied by the Board of Education for the examinations will be forwarded to the Examination Secretary.

The packets of examination questions must not, under any circumstances, be permitted to pass into the hands of a teacher, of a candidate for examination, or of any other person interested in the success of the candidates.

If the Examination Secretary is ineligible to act as Superintendent (See Section 13 above), the Managers must appoint some other responsible person to act as custodian of Examination Papers.

15. Detailed instructions for the conduct of the examinations will be addressed in due course to the Secretary and to the persons nominated as Superintendents.

16. The Department will issue to the Secretary blank cards of admission to the examinations, which must be distributed amongst the candidates. A candidate who is unable to produce the card of admission, may not, except in special circumstances, be admitted to the examination room.

17. The Department may disallow examinations which afford evidence of not having been conducted in strict accordance with the regulations; they will investigate cases of suspected irregularity, and may require any or all of the candidates to be re-examined. If any candidate should fail to appear at such investigation, or decline to be re-examined, all his previous examinations may be cancelled. When an examination has failed through no fault of the candidates, a re-examination may be allowed, the cost of which may be charged to the Managers. A re-examination will not be accepted for the purposes of Scholarships, etc.

18. All possible care is taken that the Examination Papers may be forwarded in accordance with the applications, and that the results may be issued correctly, but the Department cannot undertake to rectify mistakes, nor will they be responsible for any incidental loss.

[NOTE.—Copies of the Forms referred to herein may be obtained, after the 1st January, 1911, upon application to the Offices of the Department.]

Local Examinations.

LOCAL SCIENCE AND ART EXAMINATIONS, 1911.

Regulations respecting the Admission of External Candidates to the Local Examinations in Subjects of Science and Art, conducted by the Department of Agriculture and Technical Instruction for Ireland, on behalf of the Board of Education.

1. The examinations will be held in May and June. The dates on which the examinations in the various subjects will be held are specified in the Examination Time Table, published separately.

2. When examinations are held in several subjects on the same evening at the same time candidates may not take more than one of such subjects. Candidates may not present themselves for examination in more than one stage, or section of a stage, of any subject in the same year except in (a) Mathematics, in which subject they may take one of the stages, or Honours, of each of the two Divisions in which the examination in this subject is arranged, (b) Agricultural Science and Rural Economy, in which subject they may take the examination in one of Sections A, B, and C, and one of the Sections D, E, and F of Stage 2, and (c) Applied Mechanics, in which subject they may take the examination in Stage 2 or Stage 3 of both divisions, viz., (a) Materials and Structures, and (b) Machines and Hydraulics. A candidate taking Stage 1 of Subject VIII. may not take, in the same year, any of the sub-divisions of this subject. A candidate taking Stage 1, or Honours, of Subject VII. may not take, in the same year, either sub-division of this subject.

3. External candidates (*i.e.*, candidates who are not students of a school which is to be an examination centre), must apply not later than 11th March, to the Managers of a School where examinations in the subjects required will be held. A list of the centres at which examinations will probably be held will be issued, on Form S. 114, early in February. *The Department do not make arrangements for the examination of external candidates.*

4. Managers may charge external candidates a fee not exceeding 2s. 6d. for each morning, afternoon, or evening for which they register their names for examination. The admission of an external candidate to an examination in Practical Chemistry (Subject Xp. or XIp.), Practical Metallurgy (Subject XIXp.), Drawing from Life, Architectural Design, or Modelling, is not obligatory, and the above-mentioned limitation to the fee will not apply in the case of admission to the examinations in these subjects. These fees are additional to the fees payable to the Department for papers in Stage I. of Science Subjects and Stage I. of Design. A sum of 1s. 6d. is charged by the Department for each such paper, except in the case of Stage 1 of Practical Chemistry (Subject Xp. or XIp.), and Practical Metallurgy (Subject XIXp.), for which the fee is 2s. 6d. per paper.

5. External candidates must provide the materials required for examination in the particular subjects which they take, *e.g.*, Pens, Pencils, and Art Subjects, Drawing Boards, T Squares, Instruments, Drawing Pins, Fasteners, etc.

FORM S. 81.

SPECIAL EXAMINATION FOR TEACHERS' QUALIFICATIONS IN MANUAL TRAINING (WOODWORK), 1911.

A special examination for Teachers' qualifications in Manual Training (Woodwork) will be held in Dublin on Tuesday and Wednesday, 20th and 21st June, 1911. The subjects and Time Table of the examination will be:—

TUESDAY, JUNE 20TH.—10 a.m. to 1.30 p.m.—Drawing.

„ „ 2.15 to 5.15 p.m.—Theory.

WEDNESDAY, JUNE 21ST.—9.30 a.m. to 1 p.m.—Drawing on the Blackboard and Demonstration Exercise.

„ „ 2 to 5 p.m.—Practical Woodwork Test.

For Syllabuses of the subjects of examination see Circular Letter No. 24.

Tools, wood, drawing boards (imperial size), paper, pens, and ink will be provided by the Department, but candidates will be required to bring mathematical instruments, pencils, erasers, etc., for the examination in Drawing; and, although tools for the Practical Woodwork Test will be provided by the Department, candidates are advised to bring their own, as no allowance can be made should the candidate not consider the tools supplied as satisfactory.

Applicants for admission to the examination must be twenty-one years of age on or before the 1st January preceding the examination.

Application for admission to the examination must be made, on Form S. 32, before the 1st May.

No fee will be charged for this examination, but candidates will be required to defray all travelling and other expenses incurred by them.

CIRCULAR 74.

DEPARTMENT OF AGRICULTURE AND

TECHNICAL INSTRUCTION FOR IRELAND,

UPPER MERRION-STREET, DUBLIN,

December, 1910.

DAY TRADES PREPARATORY SCHOOLS.

SIR,—With reference to the procedure which has hitherto been followed in connection with the admission of pupils to Day Trades Preparatory Schools, and the award of Scholarships by the Managers of such Schools, I have to inform you that the Department do not find it desirable to continue the arrangement under which the annual examinations for these purposes have been conducted by them. It will, accordingly, be necessary for the Managers, in future, to undertake the conduct of the examinations themselves.

All applicants for admission to the Schools should, as heretofore, be required to undergo tests in Arithmetic, English and Drawing. The papers should be set on the Syllabuses printed hereunder, and the standard of difficulty should be approximately that which obtained in the case of papers set at the examinations held by the

Department. Candidates who do not obtain at least 50 per cent. of the aggregate marks and at least 40 per cent. of the marks allotted to each subject should not be admitted to the Schools.

The worked papers, as marked by the Examiners, together with the Schedules of marks awarded, should be retained on the School premises for the information of the Department's Inspectors,

I am, Sir,

Your obedient Servant,

T. P. GILL,
Secretary.

SYLLABUSES OF EXAMINATION.

ARITHMETIC:

The principles of Vulgar and Decimal Fractions, with examples involving addition, subtraction, and multiplication.

Proportion, Simple Interest, Practice, Unitary Method.

The Metric System.

Methods of Weighing and Measurement.

Measurement of lengths, areas, and volumes.

ENGLISH:

Composition. A short essay, or letter, of thirty or forty lines—with correct spelling, grammar, and punctuation—on some familiar subject.

Ability to answer in fully formed sentences questions on the meaning of words and phrases, and on the matter of a passage read.

Grammar. The construction of words; prefixes, affixes, and roots.

Analysis of simple and complex sentences.

Correction of faulty sentences.

Paraphrasing a short poetical extract.

DRAWING:

1. Freehand Drawing.

2. Simple exercises in Design.

3. Model Drawing of Simple Common Objects.

4. Simple Geometrical Drawing.

Candidates may be examined on any part of these Syllabuses.

One hundred marks should be assigned for Arithmetic, one hundred for English, and fifty for Drawing.

CIRCULAR 75.

DEPARTMENT OF AGRICULTURE AND

TECHNICAL INSTRUCTION FOR IRELAND,

UPPER MERRION-STREET, DUBLIN,

December, 1910.

KILLARNEY SCHOOL OF HOUSEWIFERY.

SIR.—Adverting to the Circular-letter (No. 73), issued from these Offices in September last, relative to the award, by County Committees of Technical Instruction, of Scholarships tenable at the

Killarney School of Housewifery, I have to inform you that circumstances have arisen which make it inconvenient to admit Scholarship-holders to the School on as many as four different occasions in the course of the academic year, as originally proposed. The Department have, accordingly, decided to modify the conditions attached to the award of the Scholarships so as to provide for the admission of Scholars only twice yearly, viz., on the 16th of August and on the 1st of February. Nominations for Scholarships should be forwarded by County Committees so as to reach the Offices of the Department on or before the 16th of July and the 1st of January.

I have to request that you will be good enough to note this modification in the Scholarship Scheme.

I am, Sir,

Your obedient Servant,

T. P. GILL,

Secretary.

To the Secretary

of the Committee named in the Address.

NOTES AND MEMORANDA.

A meeting of the Agricultural Board was held at the office of the Department, Upper Merrion Street, Dublin, on Tuesday, the 8th November. The following were present:—The Right Hon. T. W. Russell, P.C., Vice-President of the Department, in the chair;

Mr. Robert Downes, J.P.; Colonel N. T. Everard, H.M.L.; Sir Josslyn Gore-Booth, Bart., D.L.; Most Rev. Denis Kelly, D.D., Lord Bishop of Ross; Mr. John S. F. McCance, J.P.; Mr. William McDonald, J.P.; Mr. H. de F. Montgomery, D.L.; Mr. George Murnaghan, Mr. P. J. O'Neill, J.P.

The Very Rev. Canon Daly, D.D.; His Grace the Most Rev. Dr. Healy, Archbishop of Tuam, and the Right Hon. Lord, Monteagle, K.P., were unavoidably prevented from attending the meeting.

Mr. T. P. Gill, Secretary of the Department; Mr. J. R. Campbell, B.Sc., Assistant Secretary in respect of Agriculture; Mr. R. Cantrell, I.S.O., Chief Clerk; Mr. T. Butler, Mr. J. P. Walsh, Clerk in Charge of Accounts; Mr. J. D. Daly, M.A. (who acted as Secretary to the meeting); Mr. J. Wood, B.Sc., Agricultural Inspector, and Mr. J. V. Coyle, were also present.

The Board had the following, amongst other matters, under consideration:—

The progress of county agricultural schemes, the work of the Department's agricultural schools and stations, Forestry, Veterinary Dispensaries in Congested Districts, Horsebreeding Schemes, Proposed Bill for the improvement of the Irish Dairying Industry, Agricultural credit, and proposals relating to Inland Fisheries.

A meeting of the Board of Technical Instruction was held on Wednesday, 23rd November, 1910, at the Irish

Meeting of the Board of Technical Instruction. Training School of Domestic Economy, Kilmacud, County Dublin. The following were present:—

The Right Hon. T. W. Russell, P.C., Vice-President of the Department, in the chair; Most Revd. John Clancy, D.D., Lord Bishop of Elphin; Mr. James Crozier, J.P., V.S.; Mr. Alexander Dickson, Alderman Thomas Donnellan, Mr. Christopher J. Dunn, J.P.; Revd. Henry Evans, D.D., M.R.I.A.; Revd. T. A. Finlay, M.A.; Sir John Barr Johnston, J.P.; Mr. William Macartney, J.P.; Alderman Samuel T. Mercier, J.P.; Mr. Seaghan T. O Ceallaigh, Mr. Thomas Power, Mr. Richard Sisk, and Mr. Alexander Taylor.

Mr. T. P. Gill, Secretary of the Department; Mr. George Fletcher, F.G.S., Assistant Secretary in respect of Technical Instruction; Mr. W. Vickers Dixon, Senior Inspector for Technical Instruction; Mr. Thomas Butler, Superintendent of the Statistics and Intelligence Branch; Mr. J. P. Walsh, Clerk in Charge of Accounts; Mr. J. D. Daly, M.A. (who acted as secretary to the meeting); and Mr. A. Kelly were also present.

Technical Instruction Schemes in respect of the session 1910-11 for the following urban and county areas were considered:—*Urban Districts*—Armagh, Athlone, Ballymena, Ballymoney, Blackrock, Bray, Carrickfergus, Clonmel, Drogheda, Dromore, Enniscorthy, Galway, Holywood, Kingstown, New Ross, Newry, Newtownards, Pembroke, Queenstown, Rathmines and Rathgar, Sligo and Warrenpoint. *Counties*—Antrim, Armagh, Carlow, Cavan, Donegal, Dublin, Fermanagh, Kerry, Kildare, Kilkenny, King's County, Leitrim, Limerick, Louth, Mayo, Meath, Roscommon, Sligo, Tipperary (North Riding), Tipperary (South Riding), Tyrone, Westmeath, Wexford, and Wicklow.

The schemes were approved, and the Board concurred in the allocation of grants in aid thereof from the funds of the Department.

The Board had also under consideration the following matters:—The scheme for technical and apprenticeship scholarships, summer courses for teachers, commercial and industrial scholarships, provision for manual instruction, and the need for additional funds for the building of technical schools.

The Advisory Committee on Horse-Breeding held its eighteenth meeting at the Offices of the Department on Thursday, 8th December, 1910, at 3 p.m.

**Advisory
Committee
on Horse-
Breeding.**

Present:—The Right Honourable T. W. Russell, P.C., Vice-President of the Department (in the chair); Mr. J. R. Campbell, Assistant Secretary in respect of Agriculture; Mr. E. M. Archdall, D.L.; Major Balfe, D.L.; Mr. T. M. Carew; Mr. James Daly; Captain C. H. D. Fetherstonhaugh, D.L.; Mr. R. T. Huston, M.R.C.V.S.; Mr. Charles McConnell, J.P.; Mr. Hugh P. Ryan, and The Right Honourable F. S. Wrench, P.C.

Mr. J. V. Coyle acted as Secretary to the Committee.

- The Minutes of the last meeting, which had been circulated, were taken as read, and were accordingly signed.

The Committee had under consideration the recommendations of the Development Commissioners with regard to the Department's application for £10,000 for horse-breeding, and the scheme for encouraging the breeding of Irish draught horses was also considered and passed.

The Department have been informed, in connection with the application made by them for financial assistance from the Development Commissioners towards the development of horse breeding, that the Lords Commissioners of His Majesty's Treasury, on the recommendation of the Development Commissioners, have sanctioned a grant of £10,000 for one year for this purpose. The grant is to be expended in the following manner:—

**Grant from
Development
Fund.**

Two-fifths on the extension of the existing schemes for the registration and purchase of stallions;

Two-fifths on the extension of the existing scheme of service nomination of mares; and,

One-fifth on a new scheme to encourage the breeding of better mares of the Irish draught type.

The Treasury intimate that they will consider favourably an application for a renewal of the grant for another year, if funds are available, and if the work done by means of the grant now sanctioned proves satisfactory. A new scheme for encouraging the breeding of Irish Draught Horses has been prepared by the Department, in consultation with their Advisory Committee and with the Agricultural Board.

Horse breeders should, accordingly, note that at the forthcoming exhibitions of mares organised by County Committees of Agriculture there will be a considerable increase in the total number of nominations usually available. The Department are bringing the matter under the notice of County Committees of Agriculture with a view to having these additional nominations advertised, so as to secure an increase in the number of mares exhibited, particularly young mares.

In expending the portion of the grant ear-marked for the purchase and resale of registered stallions, the Department will give preference to those districts in which there is at present an insufficient number of registered thoroughbred sires for the proper working of the general horse-breeding scheme. The Department have recently purchased a number of suitable thoroughbred sires, which they are prepared to sell to approved applicants from suitable or needy districts which require special attention, where sires will be sold on easy terms.

The third object to which portion of the grant may be applied—viz., encouraging improvement of Irish draught horses—should prove of great interest to farmers and Irish horse-breeders generally. For years past it has been urged that steps should be taken to revive the Irish draught horse. From time to time efforts have been made by the Department to discover whether animals of this type still exist, and whether the breed could be re-established as a pure breed.

The results of these efforts so far has not been altogether encouraging; but it is held by many that the inducements available were inadequate. The Department have now decided to take this opportunity of making a sustained and determined effort to aid in the revival of this breed.

The following scheme, which has been approved by the Department's Advisory Committee and by the Agricultural Board, will be put into operation forthwith, and all owners of mares of the Irish draught type are requested without delay to enter their mares with the Department for the forthcoming special inspections, of which due notice will be given. Forms of entry may be obtained free on application to the Department's Offices.

The following are the particulars of the scheme:—

- | | |
|--|--|
| <p>Scheme for the Encouraging the Breeding of Irish Draught Horses.</p> | <p>1. The objects of this scheme are to increase the number and to improve the quality of Irish draught horses.</p> <p>2. The type of animal it is desired to encourage is one free from all trace of English or Scotch cart horse blood, standing not less than 15.2 hands high, with short, clean, flat legs, well set joints and good feet, good head and rein, well laid back shoulders, and displaying throughout its conformation a sufficiency of power to warrant it doing general farm and harness work. The action should be free and light stepping.</p> <p>3. At centres and on dates of which due notice will be given, shows of mares of the Irish draught type will be held by the Department. Subject to the provisions of this scheme, mares selected at these shows as sound and suitable for breeding will be awarded prizes of £5 (Five Pounds) each.</p> <p>4. Selected mares must be entered on the prescribed form by their owners in a Register to be called the Irish Draught Horse Register, which will be kept by the Department. The forms for the purpose may be obtained free on application to the Department.</p> <p>5. The Department will issue annually a Register of Stallions of the Irish Draught type, to be selected in accordance with the regulations for the registration of stallions under the Department's General Horse-Breeding scheme.</p> <p>6. Fillies out of mares entered in the Register and got by a registered Irish Draught stallion will, when two years old, be eligible for entry in that register provided they are passed by the Department as sound and suitable.</p> |
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A limited number of such registered fillies, selected by the Department and retained for service by an approved registered Irish Draught stallion, will be awarded, on such conditions as the Department may prescribe, a premium of £20 per annum for not more than five seasons provided a live foal resulting from such service during

the preceding year is produced during each of the five seasons in question.

7. Colts out of mares entered in the Register and got by registered Irish Draught stallions will, on inspection as two-year-olds, be purchased by the Department for a sum of not less than £200 each, provided they are passed by the Department as sound and suitable for registration.

8. The Department will, on the production of the necessary vouchers, refund the amount of the service fee and the cost of sending for service by a registered Irish Draught stallion each mare entered in the Register.

9. In future a portion of the Department's grant in respect of agricultural shows will be ear-marked for classes of mares entered in the Register, and for the progeny of such mares.

10. The decision of the Department in all matters relating to this scheme shall be final.

A meeting of the trustees appointed in connection with the scholarship for the encouragement of the study of **Coyne Memorial Political and Social Science**, especially as applied to Ireland, which was established in memory of the late Dr. W. P. Coyne, was held on Friday, 9th December, 1910, at 4 Upper Merrion Street. There were present:—Dr. Joseph McGrath (in the chair), Mr. T. P. Gill, Professor Grenville, A. J. Cole, F.G.S.; and Mr. J. D. Daly.

The Trustees had under consideration correspondence with the Coyne Scholar for the current year, Mr. P. A. O'Toole, M.A., regarding the progress of his inquiry as to the social and economic position of the rural labourer in Ireland with reference to the development of agriculture.

The Coyne Scholarship is open to graduates in Arts of the National University of Ireland, and will again be offered for competition in October, 1911. The subject prescribed for the Essay for 1911 is "The History of Industry and Employment since 1698 in any one of the following cities:—Dublin, Cork, Galway." (The successful candidate will be expected to follow out in greater detail the study of the present conditions of one or more of the industries dealt with in his Essay.)

As the season for planting gooseberry and currant bushes is now at hand, fruit growers are reminded that great care should be exercised in the selection of plants owing to the prevalence of American Gooseberry Mildew and Black Currant Mite. It is suggested that purchasers should insist on a guarantee being given by the vendors of such bushes that no disease has appeared in their stock this year.

**Diseases in
Gooseberry and
Currant Bushes—
Warning to Fruit
Growers.**

In this connection it may be well to point out that the landing in Ireland, without a licence from the Department of Agriculture, of gooseberry and currant bushes brought from any place out of Ireland is absolutely prohibited under the provisions of the American Gooseberry Mildew and Black Currant Mite (Ireland) Order, 1908. Persons importing bushes in contravention of this Order render themselves liable, on conviction, to a fine of £10 for each offence.

The attention of growers and shippers of potatoes is directed to the fact that under the provisions of the **Black Scab in Potatoes** (Ireland) Order, 1908, Black Scab is a disease which must be notified to the Department of Agriculture. Any person having in his possession, or in his charge, any potatoes diseased, or suspected of being diseased, is required to inform the Department of the fact without delay. Failure to do so renders him liable, on conviction, to a penalty of ten pounds. The notification should be accompanied by a specimen tuber, carefully wrapped up, addressed to The Secretary of the Department of Agriculture and Technical Instruction, Upper Merrion Street, Dublin.

Arrangements have been made by the Board of Trade for the temporary return to this country of His Majesty's **British Trade with Australasia.** Trade Commissioners in Australia (Mr. C. Hamilton Wickes) and New Zealand (Mr. G. H. F. Rolleston) with a view to visiting the principal industrial centres of the United Kingdom, and giving British manufacturers and merchants an opportunity of consulting them with regard to trade conditions and openings in the Dominions referred to. Chambers of Commerce and other representative commercial associations desirous of arranging for such visits should place themselves in communication with the Director of the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, London, E.C., as soon as possible. Arrangements have been made for the carrying on of the work of the Trade Commissioners' offices at Melbourne and at Wellington as usual during the absence of the Commissioners.

One of the principal duties of His Majesty's Trade Commissioners is to report to the Board of Trade promptly, and if possible in advance, any opportunities which may arise in the Dominions in the form of contracts open to tender, or in any other way for the development of British trade. The Commissioners also report to the Board periodically on the nature and extent of foreign competition and other matters of commercial interest, including changes in Customs duties and regulations, financial and trade conditions, changes in regard to means of transport, and legislation affecting trade and commerce; and they furnish periodically lists of probable buyers of

European goods in the Dominions. A good deal of the information so furnished is published by the Board's Intelligence Branch in the weekly "Board of Trade Journal," some is communicated to Chambers of Commerce likely to be specially interested and to those British firms whose names are inscribed in the Special Register of the Intelligence Branch, and some—*e.g.*, lists of names of traders at particular places, detailed Customs regulations affecting particular matters, and similar information of limited interest—is filed at the Intelligence Branch for the information of persons interested who apply, either personally or by letter.

The Trade Commissioners also reply directly to all enquiries which may be addressed to them directly by British merchants and manufacturers. The number of these direct enquiries is increasing rapidly, but it is generally desirable that enquiries should be made through the Commercial Intelligence Branch (73, Basinghall Street, E.C.), which is often in possession of the information sought and is thus in a position to save the enquirer much delay.

The sixth of this year's series of Surprise Butter Competitions conducted by the Department of Agriculture and Technical Instruction for Ireland was held on the 16th November, 1910. The judges were two in number, being representative butter merchants of Cork and Glasgow. Prizes were awarded to the under-mentioned competitors:—Scottish Co-operative Wholesale Society, Ltd.; Dromahaire Co-operative Agricultural and Dairy Society, Ltd.; Rattoo Co-operative Agricultural and Dairy Society, Ltd.; Derrygonnelly Co-operative Agricultural and Dairy Society, Ltd.; Irvinestown Co-operative Agricultural and Dairy Society, Ltd.; Tamnaskenny Co-operative Agricultural and Dairy Society, Ltd.; Knockulty Creamery (Newmarket) Dairy Company, Ltd.

The seventh Competition was held on the 14th December, 1910. The judges were two in number, being representative butter merchants of Belfast and Manchester. Prizes were awarded to the under-mentioned competitors:—Scottish Co-operative Wholesale Society, Ltd.; Lagan Co-operative Agricultural and Dairy Society, Ltd.; Lisbellaw Co-operative Agricultural and Dairy Society, Ltd.; Abbeydorney Co-operative Dairy Society, Ltd.

A special additional prize of 10s. was awarded at each competition to the dairymaid in the case of the exhibits obtaining a First Class prize.

STATISTICAL TABLES.

STATISTICAL

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

—	North Coast.				East Coast.			
	1910.		1909.		1910.		1909.	
	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	—	—	—	—	14	27	6	15
Soles,	13	66	4	21	92	364	141	549
Turbot,	2	5	—	—	30	122	32	118
Total Prime Fish, . .	15	71	4	21	136	513	179	682
Cod,	74	59	71	35	776	623	809	524
Conger Eel,	19	12	2	1	556	234	578	195
Haddock,	3	2	44	23	569	437	596	446
Hake,	—	—	—	—	564	420	579	468
Herrings,	8,225	2,258	9,303	3,105	6,519	1,467	3,604	891
Ling,	—	—	2	1	400	166	620	159
Mackerel,	36	4	—	—	98	24	491	114
Plaice,	148	150	35	30	549	607	735	765
Ray or Skate,	241	59	158	40	603	178	642	164
Sprats,	—	—	—	—	—	—	—	—
Whiting,	—	—	—	—	342	271	634	406
All other except Shell Fish	103	29	105	19	518	334	732	382
Total,	8,864	2,650	9,724	3,275	11,630	5,274	10,199	5,196
SHELL FISH :—	No.		No.		No.		No.	
Crabs,	2,148	6	1,296	4	2,168	8	1,260	5
Lobsters,	1,152	30	1,216	37	9,822	277	985	38
	Cwts.		Cwts.		Cwts.		Cwts.	
Mussels,	—	—	—	—	62	5	148	10
	No.		No.		No.		No.	
Oysters,	—	—	—	—	126	1	—	—
	Cwts.		Cwts.		Cwts.		Cwts.	
Other Shell Fish, . .	—	—	—	—	229	133	55	33
Total,	—	36	—	41	—	424	—	86
Total value of Fish landed	—	2,686	—	3,316	—	5,698	—	5,282

NOTE.—The above figures are subject

TABLES.

IRELAND.

as Landed on the Irish Coasts during the month of October, 1910, as corresponding period in 1909.

South Coast.				West Coast.				Total.			
1910.		1909.		1910.		1909.		1910.		1909.	
Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
10	24	4	9	—	—	—	—	24	51	10	24
34	151	31	161	73	299	60	217	212	880	236	948
11	47	3	13	18	86	16	81	61	260	51	212
55	222	38	183	91	385	76	298	297	1,191	297	1,184
12	8	16	7	—	—	48	16	862	690	944	582
—	—	—	—	2	1	—	—	577	247	580	196
14	9	8	8	142	99	244	176	728	547	892	653
—	—	—	—	123	54	204	76	687	474	783	544
2,719	812	1,267	390	10,202	2,934	4,352	1,202	27,665	7,471	18,526	5,588
7	7	—	—	—	—	—	—	407	173	622	160
12,794	1,810	6,473	1,260	11,580	2,615	9,202	3,257	24,508	4,453	16,166	4,631
150	195	106	151	177	144	161	210	1,024	1,102	1,037	1,156
5	3	6	3	45	20	—	—	894	260	806	207
296	46	14	3	—	—	—	—	296	46	14	3
106	45	55	15	181	66	269	86	629	382	958	507
269	116	238	118	392	212	296	155	1,282	691	1,371	674
16,427	3,273	8,221	2,138	22,935	6,530	14,852	5,476	59,856	17,727	42,996	16,085
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
9,715	323	5,424	198	480	2	172	9,903	4,796	16	2,565	9
Cwts.	—	Cwts.	—	4,745	—	—	383	25,434	802	17,328	656
54	14	—	—	3,400	340	—	—	3,516	359	148	10
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
2,772	11	6,426	18	—	—	5,229	8	2,898	12	11,655	26
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
392	40	225	25	441	78	351	58	1,062	251	631	116
—	388	—	241	—	592	—	449	—	1,440	—	817
—	3,661	—	2,379	—	7,122	—	5,925	—	19,167	—	16,902

to correction in the Annual Returns.

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

	North Coast.				East Coast.			
	1910.		1909.		1910.		1909.	
	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	—	—	—	—	35	54	18	35
Soles,	1	3	1	4	114	450	196	669
Turbot,	—	—	1	2	52	225	44	187
Total Prime Fish,	1	3	2	6	201	729	258	891
Cod,	258	154	313	150	1,795	1,409	1,563	1,132
Conger Eel,	10	4	8	6	551	256	795	246
Haddock,	51	25	75	41	631	459	796	620
Hake,	—	—	—	—	590	471	781	590
Herrings,	592	168	32,509	9,782	30,118	6,456	20,599	4,019
Ling,	—	—	—	—	450	199	804	190
Mackorel,	—	—	—	—	—	—	28	18
Plaice,	21	20	6	6	878	920	1,126	1,088
Ray or Skate,	41	8	67	17	630	190	920	223
Sprats,	—	—	—	—	—	—	—	—
Whiting,	—	—	—	—	418	326	837	486
All other except Shell Fish,	95	25	70	21	536	388	948	513
Total,	1,069	407	33,050	10,029	36,848	11,803	29,456	10,014
SHELL FISH :—	No.		No.		No.		No.	
Crabs,	864	2	—	—	123	1	161	1
Lobsters,	240	5	132	6	8,102	352	570	27
Mussels,	Cwts.	—	Cwts.	—	199	12	273	17
Oysters,	No.	—	No.	—	882	4	630	3
Other Shell Fish,	Cwts.	—	Cwts.	—	291	191	46	29
Total,	—	7	—	6	—	560	—	77
Total value of Fish Landed,	—	414	—	10,035	—	12,363	—	10,091

NOTE.—The above figures are subject

IRELAND.

as landed on the IRISH COASTS during the month of November, 1910, as corresponding period in 1909.

South Coast.				West Coast.				Total.			
1910.		1909.		1910.		1909.		1910.		1909.	
Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
15	31	12	25	—	—	—	—	50	85	30	60
31	137	50	254	50	232	121	410	196	822	368	1,337
14	54	12	49	17	83	24	101	83	362	81	339
60	222	74	328	67	315	145	511	329	1,269	479	1,736
149	96	172	103	103	48	143	66	2,305	1,707	2,194	1,451
7	5	20	10	24	14	46	20	592	279	869	282
27	23	113	72	375	247	369	240	1,084	754	1,353	973
4	4	2	2	60	28	41	17	654	503	824	609
2,026	682	1,927	587	2,436	924	5,886	1,428	35,172	8,230	60,921	15,816
112	72	51	38	9	5	71	27	571	276	926	255
3,618	753	9,696	2,103	15,806	3,954	13,274	4,533	19,424	4,707	22,996	6,652
346	374	194	223	129	118	133	199	1,374	1,432	1,459	1,516
10	3	—	—	8	3	191	48	689	204	1,178	288
88	18	1,051	211	—	—	30	5	88	18	1,081	216
158	78	95	30	297	119	236	112	873	523	1,168	628
243	104	265	123	163	71	526	265	1,087	588	1,809	922
6,848	2,434	13,660	3,830	19,477	5,846	21,091	7,471	64,242	20,490	97,257	31,344
No.	—	No.	—	No.	—	No.	—	No.	987	No.	161
1,020	32	300	14	2,320	80	6,329	255	11,682	469	7,331	302
Cwts.	—	Cwts.	—	175	13	160	12	374	25	433	29
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
3,276	13	12,348	34	—	—	69,993	94	4,158	17	82,971	131
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
455	101	543	155	669	125	547	104	1,415	417	1,136	288
—	146	—	203	—	218	—	465	—	931	—	751
—	2,580	—	4,033	—	6,064	—	7,936	—	21,421	—	32,095

to correction in the Annual Returns.

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

	North Coast.				East Coast.			
	1910.		1909.		1910.		1909.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	—	—	—	—	47	70	35	56
Soles,	—	—	—	—	113	447	116	465
Turbot,	—	—	—	—	37	164	36	147
Total Prime Fish,	—	—	—	—	197	681	187	668
Cod,	533	223	207	84	1,370	1,139	1,353	1,125
Conger Eel,	5	3	6	4	470	201	776	257
Haddock,	138	63	136	82	538	411	704	566
Hake,	—	—	—	—	549	433	771	624
Herrings,	37,060	15,588	4,525	1,480	9,228	2,126	13,230	2,907
Ling,	—	—	—	—	520	217	780	197
Mackerel,	300	108	186	50	—	—	—	—
Plaice,	13	12	52	14	285	310	342	357
Ray or Skate,	113	28	57	15	503	169	801	219
Sprats,	—	—	—	—	—	—	—	—
Whiting,	13	7	1	1	393	325	733	445
All other except Shell Fish	55	15	110	35	379	247	784	417
Total,	38,230	16,047	5,280	1,765	14,432	6,259	20,461	7,782
SHELL FISH :—	No.	—	No.	—	No.	—	No.	—
Crabs,	—	—	—	—	—	—	—	—
Lobsters,	—	—	—	—	2,590	138	385	16
Mussels,	Cwts.	—	Cwts.	—	Cwts.	13	Cwts.	355
Oysters,	No.	—	No.	—	No.	7	No.	1,543
Other Shell Fish,	Cwts.	—	Cwts.	—	Cwts.	324	Cwts.	52
Total,	—	—	—	—	—	327	—	81
Total value of Fish landed	—	16,047	—	1,765	—	6,586	—	7,863

NOTE.—The above figures are subject

IRELAND.

as landed on the IRISH COASTS during the month of December, 1910, as corresponding period in 1909.

South Coast.				West Coast.				Total.			
1910.		1909		1910		1909		1910		1909	
Quan- tity.	Value	Quan- tity.	Value	Quan- tity	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
1	2	7	16	2	8	2	4	50	80	44	76
7	30	19	84	51	215	53	211	171	692	188	760
1	2	4	14	20	87	16	74	58	253	56	235
9	34	30	114	73	310	71	289	279	1,025	288	1,071
28	20	50	42	194	108	171	71	2,125	1,400	1,781	1,322
—	—	1	1	71	29	12	5	546	233	795	267
4	4	113	98	1,858	1,102	577	318	2,538	1,580	1,530	1,064
—	—	—	—	20	11	—	—	569	444	771	624
10,623	2,786	5,470	1,393	1,030	390	10,333	2,766	57,941	20,890	33,578	8,546
32	21	23	19	42	23	85	35	594	261	888	251
3,959	849	4,998	1,507	4,595	1,518	10,702	3,619	8,854	2,475	15,886	5,176
72	74	136	152	131	103	91	121	501	499	621	644
—	—	3	1	70	21	51	11	686	218	912	246
47	9	562	104	—	—	—	—	47	9	562	104
19	12	152	41	1,140	419	248	154	1,565	763	1,134	641
103	60	117	62	54	54	80	57	591	376	1,091	571
14,896	3,869	11,655	3,534	9,278	4,088	22,441	7,446	76,836	30,263	59,837	20,527
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
—	—	—	—	593	24	1,973	61	3,183	162	2,058	77
Cwts.	—	Cwts.	—	Cwts.	54	Cwts.	3	Cwts.	137	Cwts.	257
70	18	—	—	54	3	3,510	234	137	22	3,865	257
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
3,024	12	8,568	23	77,490	138	498,693	989	81,616	157	508,804	1,020
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
313	88	508	79	668	135	565	114	1,305	404	1,125	227
—	118	—	102	—	300	—	1,398	—	745	—	1,581
—	3,987	—	3,636	—	4,388	—	8,844	—	31,008	—	22,108

to correction in the Annual Returns.

STATEMENT of the TOTAL VALUE of FISH landed on the ENGLISH and WELSH COASTS during the Month and Twelve Months ended 31st December, 1910, compared with the corresponding Periods of the Year 1909.

	December.		Twelve months ended 31st December.	
	1910.	1909.	1910.	1909.
	VALUE.			
	£	£	£	£
Brill,	4,585	4,216	49,449	54,480
Soles,	33,108	31,016	402,505	422,140
Turbot,	26,090	27,382	249,513	258,968
Prime Fish not separately distinguished,	448	353	6,455	7,481
Total Prime Fish, ..	64,231	62,967	707,922	743,069
Bream,	1,703	2,127	17,842	18,112
Catfish,	536	332	26,580	20,066
Coalfish,	8,212	4,707	68,925	41,750
Cod,	100,252	87,509	1,178,525	959,827
Conger Eels,	2,237	2,310	33,802	35,207
Dabs,	4,851	6,163	76,967	73,256
Dogfish,	1,254	865	7,109	7,095
Dory,	70	114	1,868	1,580
Flounders or Flukes, ..	172	223	3,406	3,919
Gurnards,	2,115	1,814	26,099	24,835
Haddock,	111,632	109,056	1,220,360	1,213,630
Hake,	30,332	33,172	604,903	577,516
Halibut,	23,164	18,542	357,187	375,828
Latchets (Tubs),	75	104	1,597	2,357
Lemon Soles,	6,581	5,864	116,196	101,804
Ling,	7,327	6,498	90,909	81,152
Megrims,	6,898	5,925	75,797	67,591
Monks (or Anglers), ..	1,593	1,460	15,967	15,204
Mullet (Red),	57	66	1,121	806
Plaice,	81,278	66,748	945,805	919,627
Pollack,	597	742	12,456	10,276
Skates and Rays,	16,713	19,442	224,084	230,591
Torsk,	1,008	780	9,458	8,866
Whiting,	15,624	13,197	161,903	132,320
Witches,	3,877	6,702	43,328	43,890
Herrings,	51,612	47,535	1,470,775	1,375,597
Mackerel,	310	801	190,250	183,090
Mullet (Grey),	47	86	1,600	1,467
Pilchards,	—	6	38,097	20,294
Sprats,	5,952	4,607	14,648	12,335
Whitebait,	949	1,182	13,293	12,039
Fish not separately distinguished,	10,495	10,442	191,852	182,115
Total,	561,754	522,039	7,951,231	7,497,139
Shell Fish :—				
Crabs,	509	826	51,726	53,075
Lobsters,	227	354	25,436	26,255
Oysters,	4,533	8,558	42,561	65,291
Other Shell Fish,	7,812	8,046	109,230	118,246
Total,	13,081	17,784	228,953	262,900
Total value of all Fish, ..	574,835	539,823	8,180,184	7,760,039

NOTE.—The figures for 1910 are subject to correction in the Annual Returns.

STATEMENT of the TOTAL QUANTITY of FISH landed on the ENGLISH and WELSH COASTS during the Month and Twelve Months ended 31st December, 1910, compared with the corresponding Periods of the Year 1909.

	December.		Twelve months ended 31st December.	
	1910.	1909.	1910.	1909.
	QUANTITY.			
	Cwts.	Cwts.	Cwts.	Cwts.
Brill,	1,319	1,345	14,957	18,513
Soles,	4,707	4,456	58,543	64,284
Turbot,	4,926	5,161	50,953	59,144
Prime Fish not separately distinguished,	289	246	4,294	4,967
Total Prime Fish,	11,241	11,208	128,747	146,908
Bream,	5,600	8,284	65,077	82,277
Catfish,	1,036	717	63,669	63,643
Coalfish,	27,239	20,396	325,615	227,772
Cod,	166,293	168,470	2,364,743	2,151,109
Conger Eels,	2,779	3,166	43,081	48,556
Dabs,	6,255	8,177	112,371	117,085
Dogfish,	4,880	3,706	25,712	30,634
Dory,	69	115	2,001	1,893
Flounders or Flukes,	301	330	5,167	6,834
Gurnards,	6,947	6,188	100,009	105,148
Haddock,	147,342	198,617	2,039,327	2,223,552
Hake,	29,324	34,010	789,456	891,646
Halibut,	6,289	5,852	142,266	165,764
Latchets (Tubs),	118	183	2,769	3,941
Lemon Soles,	1,862	1,785	52,907	51,281
Ling,	16,189	17,591	218,446	227,376
Megrims,	9,529	8,406	118,193	106,353
Monks (or Anglers),	3,622	3,550	37,288	36,865
Mullet (Red),	18	24	359	295
Plaice,	67,403	49,947	917,629	1,051,665
Pollack,	1,028	1,426	26,709	23,529
Skates and Rays,	26,700	31,048	367,078	415,704
Torsk,	1,641	1,789	20,101	25,180
Whiting,	26,372	33,475	334,160	304,467
Witches,	2,872	5,811	35,244	42,913
Herrings,	98,565	121,654	3,827,627	4,564,124
Mackerel,	345	916	408,070	367,265
Mullet (Grey),	25	17	873	832
Pilchards,	1	8	90,165	57,390
Sprats,	32,252	27,424	72,554	73,608
Whitebait,	488	617	6,827	7,011
Fish not separately distinguished,	21,628	23,999	340,656	332,333
Total,	726,253	798,884	13,084,996	13,954,953
Shell :—	No.	No.	No.	No.
Crabs,	33,774	50,595	4,486,627	4,521,766
Lobsters,	4,782	7,098	533,216	546,805
Oysters,	1,560,342	2,478,185	15,334,261	20,268,119
Other Shell Fish,	Cwts. 43,873	Cwts. 40,266	Cwts. 445,328	Cwts. 451,750

NOTE.—The figures for 1910 are subject to correction in the Annual Returns.

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as landed on the SCOTTISH COASTS during the Month and Twelve Months ended 31st December, 1910, compared with the corresponding periods of the Year 1909.

	December.		Twelve Months ended 31st December.	
	1910.	1909.	1910.	1909.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Herrings,	67,707	44,412	5,687,220	4,541,307
Sprats,	3,158	877	9,675	19,379
Sparlings,	14	60	325	419
Mackerel,	543	278	43,831	31,352
Cod,	59,434	55,025	981,911	880,622
Ling,	9,924	6,947	228,741	190,872
Torsk (Tusk),	1,523	754	18,021	16,611
Saltn (Coal Fish),	18,330	14,995	211,232	187,498
Haddock,	89,024	112,981	922,865	1,021,997
Whiting,	12,291	13,790	150,945	129,806
Conger Eel,	1,757	1,132	26,312	25,018
Turbot,	302	388	5,037	6,346
Hallbut,	1,427	1,810	51,316	49,333
Lemon Soles,	2,182	2,361	44,810	41,155
Flounders, Plaice, Brill,	4,483	6,848	64,528	73,879
Skate and Ray,	7,945	5,071	138,324	116,357
Fish not separately distinguished, except Shell Fish,	9,865	10,944	130,395	112,338
Total,	289,909	277,453	3,715,014	7,422,785
Shell Fish :—	No.	No.	No.	No.
Crabs,	62,394	91,369	2,199,763	2,624,685
Lobsters,	48,568	46,786	683,856	658,622
Oysters,	183,360	151,599	877,124	1,226,097
	Cwts.	Cwts.	Cwts.	Cwts.
Clams,	2,210	1,229	9,947	7,404
Mussels,	12,575	15,488	98,517	109,541
Other Shell Fish,	3,047	3,299	43,698	45,512
VALUE.				
	£	£	£	£
Herrings,	17,986	14,449	1,594,308	1,569,743
Sprats,	729	219	2,894	3,002
Sparlings,	34	161	881	1,123
Mackerel,	284	116	10,965	9,425
Cod,	31,635	29,364	409,644	337,567
Ling,	3,439	2,399	71,617	50,531
Torsk (Tusk),	612	251	5,231	3,925
Saltn (Coal Fish),	2,778	2,007	32,381	24,004
Haddock,	53,794	50,318	523,758	492,919
Whiting,	5,914	6,948	65,551	49,361
Conger Eel,	813	474	10,773	8,381
Turbot,	1,135	1,535	17,816	20,740
Hallbut,	3,975	3,780	99,675	84,048
Lemon Soles,	5,947	5,923	80,409	74,627
Flounders, Plaice, Brill,	5,881	8,021	80,868	84,675
Skate and Ray,	2,208	1,573	31,292	26,467
Fish not separately distinguished except Shell Fish,	6,494	5,424	61,149	48,572
Total,	143,658	130,682	3,104,212	2,889,207
Shell Fish :—				
Crabs,	299	426	14,031	15,639
Lobsters,	2,804	2,700	34,795	32,682
Oysters,	618	524	3,473	4,414
Clams,	327	215	1,501	1,143
Mussels,	556	629	4,475	4,896
Other Shell Fish,	657	765	11,487	12,467
Total,	5,261	5,269	69,762	72,198
Total Value of Fish landed,	148,919	136,251	3,173,974	2,961,405

NOTE.—The above figures are subject to correction in the Annual Returns.

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as landed on the IRISH COASTS during the Month and Twelve Months ended 31st December, 1910, compared with the corresponding Periods of the Year 1909.

	December.		Twelve Months ended 31st December.	
	1910.	1909.	1910.	1909.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Brill,	50	44	357	427
Sole,	171	188	2,307	2,221
Turbot,	58	66	655	758
Total Prime Fish,	279	298	3,379	4,111
Cod,	2,125	1,781	23,938	27,695
Conger Eel,	546	795	7,707	9,899
Haddock,	2,538	1,530	16,751	16,811
Hake,	569	771	9,154	9,077
Herrings,	57,941	33,578	496,138	465,794
Ling,	594	888	6,582	11,517
Mackerel,	8,854	15,886	303,619	263,798
Plaice,	501	621	12,513	11,825
Ray or Skate,	696	912	10,511	11,552
Sprats,	47	562	1,373	2,358
Whiting,	1,565	1,134	13,676	14,788
Fish not separately distinguished, except Shell Fish,	501	1,001	19,334	24,621
Total	76,836	59,837	924,675	879,336
SHELL FISH.—				
	No.	No.	No.	No.
Crabs,	—	—	141,127	216,112
Lobsters,	3,183	2,058	324,585	426,930
Oysters,	81,616	508,804	179,565	751,628
	Cwts.	Cwts.	Cwts.	Cwts.
Mussels,	137	3,865	10,000	7,109
Other Shell Fish,	1,305	1,125	13,137	13,394
VALUE.				
	£	£	£	£
Brill,	80	76	631	698
Sole,	692	760	10,084	10,763
Turbot,	253	235	2,811	2,883
Total Prime Fish,	1,025	1,071	13,526	14,344
Cod,	1,490	1,322	13,917	14,646
Conger Eel,	233	267	2,965	3,840
Haddock,	1,580	1,084	10,686	10,683
Hake,	444	624	6,674	6,518
Herrings,	20,690	6,546	133,469	112,311
Ling,	261	351	2,610	3,667
Mackerel,	2,475	5,176	70,343	53,861
Plaice,	499	644	13,402	10,912
Ray or Skate,	218	246	2,695	2,715
Sprats,	9	104	232	490
Whiting,	763	641	7,596	7,834
Fish not separately distinguished, except Shell Fish,	376	571	9,102	9,573
Total,	30,263	20,527	287,217	251,984
SHELL FISH.—				
	£	£	£	£
Crabs,	—	—	491	823
Lobsters,	162	77	12,499	11,361
Oysters,	157	1,020	764	1,346
Mussels,	22	267	568	504
Other Shell Fish,	404	237	3,567	2,973
Total,	745	1,581	17,879	17,907
Total Value of Fish landed,	31,008	22,108	305,096	268,991

NOTE.—The above figures are subject to correction in the Annual Returns.

QUARTERLY AVERAGE PRICES OF CROPS, LIVE STOCK, MEAT, PROVISIONS, &c..
for the period ended 31st DECEMBER, 1910.

PRODUCT	PROVINCE				IRELAND	
	Leinster.	Munster.	Ulster.	Con-naught.	1910	1909
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
CROPS:—						
Wheat, . . . per 112 lbs.	6 9½	6 11½	—	—	6 9½	7 8
Oats (White) . . . "	5 7½	5 6½	5 5½	5 8½	5 6½	6 1
" Black . . . "	5 3½	5 0½	—	—	5 0½	5 6
Barley, . . . "	7 0½	6 10½	—	—	6 11½	7 1½
Potatoes, . . . "	3 5½	3 0½	2 10½	3 7½	3 3½	2 6
Hay (Clover) . . . "	4 4½	3 2½	3 1	3 2½	3 7	4 2½
" (Meadow) . . . "	2 9½	2 3½	2 8½	2 1½	2 5½	3 1½
Grass Seed—						
(Perennial Rye) . . . "	—	—	12 7½	—	12 7½	15 5½
(Italian Rye) . . . "	—	—	17 6	—	17 0	19 3½
Flax, . . . per 14 lbs.	—	—	9 0½	—	9 0½	7 4
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
LIVE STOCK:—						
Calves (young) . . . per head	2 2 0	1 17 0	1 15 10	1 17 6	1 19 3	—
" (over 6 and not exceeding 12 months) . . . per head	5 8 8	4 2 3	4 17 1	4 13 6	4 11 6	—
Store Cattle—						
One year old and under two years . . . per head	8 19 9	8 0 11	7 8 6	7 10 7	8 3 1	8 0 1
Two years old and under three years . . . per head	12 2 0	10 11 4	9 16 9	10 10 9	11 2 9	10 15 7
Three years old and over . . . "	14 13 5	11 1 7	13 19 1	13 4 1	13 3 9	12 18 9
Fat Cattle—						
Two years old and under three years . . . per head	14 16 0	13 11 8	13 19 9	14 7 0	14 3 10	—
Three years old and over . . . "	16 15 4	15 4 11	16 1 8	15 11 6	16 1 6	—
Cows and Bulls . . . per head	14 2 2	12 8 8	12 10 8	12 9 9	12 14 4	—
Springers—						
Cows and Heifers . . . per head	16 4 5	14 6 6	15 13 1	15 9 9	15 8 3	15 3 6
Milch Cows (down calved) . . . "	14 12 0	13 16 2	14 7 9	12 15 8	14 0 0	—
Lambs (under 12 months old) . . . per head	1 6 8	1 5 10	1 4 11	1 5 4	1 6 0	1 3 6
Store Sheep—						
One year old and under two years . . . per head	1 15 8	1 14 0	1 9 7	1 17 10	1 16 4	1 12 3
Two years old and over . . . "	1 11 1	1 5 0	1 9 0	2 2 5	1 18 3	1 15 11
Fat Sheep—						
One year old and under two years . . . per head	1 19 0	2 2 9	2 2 0	2 6 1	2 1 7	—
Two years old and over . . . "	1 18 5	1 16 2	1 15 6	2 8 2	1 19 5	—
Young Pigs—						
8 to 10 weeks old . . . per head	1 7 2	1 8 6	1 8 6	1 4 3	1 7 6	1 6 8
Under four months old . . . "	1 19 0	1 19 5	2 10 9	2 6 10	2 0 4	—
Fat Pigs, . . . "	3 15 9	4 2 4	4 0 0	5 8 11	5 3 6	—
Sows, . . . "	5 16 5	7 11 5	6 5 10	7 10 0	7 1 0	—
MEAT, PROVISIONS, &c.						
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Beef (Live) . . . per 112 lbs.	—	—	—	—	32 1	31 9
" (Dead), . . . "	—	—	—	—	56 2	55 7
Mutton (Live), . . . "	—	—	—	—	32 1	28 5
" (Dead), . . . "	—	—	—	—	56 2	49 9
Pork (Dead), . . . "	54 1	56 5	52 9	53 6	55 11	56 2
Butter (Creamery) . . . "	112 10	108 3	—	—	108 4	113 8
" (Factory), . . . "	96 6	93 2	—	—	93 6	95 1
" (Farmers), . . . "	94 4	93 3	103 10	96 4	94 1	94 8
Eggs, . . . per 120	13 11½	12 10½	—	12 2½	13 7	12 4½
Wool, . . . per lb.	0 11½	0 10	—	0 11	0 11½	0 10½

WEEKLY AVERAGE PRICES of WHEAT, OATS, and BARLEY, per 112 lbs., computed from Market Returns of certain quantities of these Cereals supplied by Officers of Customs and Excise, during the QUARTER ended 31st DECEMBER, 1910.

Returns received in the Week ended	WHEAT.		OATS.		BARLEY.	
	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.
1910.	<i>s. d.</i>	Cwts. of 112 lbs.	<i>s. d.</i>	Cwts. of 112 lbs.	<i>s. d.</i>	Cwts. of 112 lbs.
October, 1	6 8½	5,163	5 2½	31,491	7 0½	19,854
" 8	6 11	2,283	5 2½	34,902	6 11	13,724
" 15	6 11½	782	5 2½	32,851	6 10½	12,642
" 22	6 10½	815	5 2	27,049	6 10½	7,994
" 29	6 9½	4,000	5 2½	26,083	6 11	4,868
November, 5	6 9½	2,107	5 3½	20,482	6 7½	1,450
" 12	6 10½	2,292	5 3½	20,526	6 0½	480
" 19	6 7½	421	5 3½	18,776	6 6½	260
" 26	6 9	1,328	5 4½	18,366	6 0	32
December, 3	6 7½	420	5 4	14,173	—	—
" 10	6 8½	322	5 4½	14,703	6 4½	300
" 17	6 8½	554	5 4½	9,300	—	—
" 24	6 6	162	5 3½	6,216	—	—
" 31	6 10½	537	5 4½	4,654	—	—

QUARTERLY AVERAGE PRICES of FAT CATTLE and FAT SHEEP, per 112 lbs., LIVE WEIGHT, sold in DUBLIN MARKETS during the period ended 31st DECEMBER, 1910, and also for the corresponding period during thirteen preceding years.

Year.	Fat Cattle.	Fat Sheep.	Year.
	<i>£ s. d.</i>	<i>£ s. d.</i>	
1910.	1 12 1	1 12 1	1910.
1909.	1 11 9	1 8 5	1909.
1908.	1 11 4	1 11 6	1908.
1907.	1 9 6	1 15 7	1907.
1906.	1 9 0	1 17 10	1906.
1905.	1 8 7	1 14 6	1905.
1904.	1 9 2	1 15 0	1904.
1903.	1 9 5	1 13 10	1903.
1902.	1 11 5	1 12 3	1902.
1901.	1 9 11	1 10 2	1901.
1900.	1 10 7	1 12 3	1900.
1899.	1 10 8	1 12 4	1899.
1898.	1 7 9	1 11 5	1898.
1897.	1 8 1	1 12 7	1897.

NUMBER OF ANIMALS included in Returns furnished under the MARKETS and FAIRS (Weighing of Cattle) ACT, 1891, Sections 3 and 4,
during the Quarter ended 31st DECEMBER, 1910.

WEEK ENDED	FAT CATTLE.				FAT SHEEP.			
	Dublin.		Belfast.		Dublin.		Belfast.	
	Corporation Market Authorities.	Mr. Gavin Low, Auctioneer.	Corporation Market Authorities.	Mr. John Robson, Auctioneer.	Corporation Market Authorities.	Mr. Gavin Low, Auctioneer.	Corporation Market Authorities.	Total Number of Sheep included in Returns.
1910.								
October, 6	85	260	49	—	—	172	—	172
" 13	79	248	51	—	—	330	—	330
" 20	100	234	50	—	—	212	—	212
" 27	95	263	51	46	—	239	—	239
November, 3	105	228	50	35	—	281	—	281
" 10	75	304	51	39	—	347	—	347
" 17	92	216	51	44	—	151	—	151
" 24	85	230	50	37	—	252	—	252
December, 1	107	194	51	31	—	210	—	210
" 8	70	216	50	34	—	277	—	277
" 15	99	174	50	35	—	196	—	196
" 22	49	50	50	—	26	101	—	127
" 29	78	180	49	—	—	158	—	158
Totals,	1,119	2,797	653	301	26	2,926	—	2,952

DISEASES OF ANIMALS IN IRELAND.

NUMBER of OUTBREAKS of SWINE FEVER, and NUMBER of SWINE returned as having been SLAUGHTERED in Ireland, under the Diseases of Animals Act of 1894, in the undermentioned period, by Order of the Department.

Quarter ended.	SWINE-FEVER.	
	Outbreaks confirmed.	Swine Slaughtered as Diseased or as having been Exposed to Infection
31st December, 1910,	32	543

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been Attacked by ANTHRAX and GLANDERS in Ireland in the undermentioned period.

Quarter ended.	ANTHRAX.		GLANDERS (including Farcy).		Epizootic Lymphangitis.	
	Outbreaks Reported.	Animals Attacked	Outbreaks Reported.	Animals Attacked.	Outbreaks Reported.	Animals Attacked.
31st Dec., 1910.	2	5	—	—	—	—

NUMBER of CASES of RABIES in DOGS in IRELAND during the undermentioned period.

Quarter ended.	Number of Cases.
31st December, 1910,	—

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been attacked by SHEEP-SCAB and PARASITIC-MANGE in Ireland in the undermentioned period.

Quarter ended.	SHEEP-SCAB.		PARASITIC-MANGE.	
	Outbreaks Reported.	Sheep Attacked.	Outbreaks Reported.	Animals Attacked.
31st Dec., 1910	129	1,468	6	8

Veterinary Branch,
Department of Agriculture and Technical Instruction
for Ireland, Dublin

BUTTER PRICES DURING THE QUARTER

ABSTRACTED FROM "THE GROCER," "GROCERS' REVIEW,"

Excepting 1-lb. Rolls and Farmers' Butter all quotations are the
an Irish Creamery would be 5s. to 7s. per cwt. less than
freight, commission,

COUNTRY OF ORIGIN.	Type of Package	Place of Sale.	WEEK ENDED.				
			OCTOBER.				
			1st	8th	15th	22nd	29th
IRELAND— Creamery Butter,	Kieis, kegs, or pyramid boxes	London, ..	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.
		Liverpool, ..	112-116	112-116	112-116	110-116	108-114
		Bristol, ..	112-116	112-116	114-116	113-116	112-114
		Cardiff, ..	114-118	114-118	114-118	115-118	114-118
		Manchester, ..	116-117	115-116	116-118	116-118	114-116
		Birmingham, ..	113-118	114-118	114-119	114-120	112-117
		Glasgow, ..	113-117	115-116	115-118	115-117	114-117
		Glasgow, ..	113-114	113-114	-	114-115	114-115
		Waterford, ..	-	-	-	-	-
		Cork, ..	-	-	-	-	-
		Belfast, ..	-	-	-	-	-
		Dublin, ..	112-114	112-114	114-116/8	114-116/8	113-116
		F. O. R., ..	117.3 126	118.4 126	119 126	119 126	118.4 126
	1lb rolls, in boxes, Salted or unsalted	London, ..	96-105	98-105	96-106	96-104	96-102
		Liverpool, ..	100-104	100-104	103-106	100-105	100-105
		Bristol, ..	100-104	100-106	100-106	100-106	102-104
		Cardiff, ..	102-106	106	100-104	100-106	104
		Manchester, ..	-	-	-	-	-
Factories, ..	Firkins 1st, Ex- port Price	Cork, ..	96-98	96	96-96	94-95	92-96
		Cork, ..	93-96	92-94	92-94	93	90-93
		Cork, ..	89-93	88-92	90	88	85
		Cork, ..	92-9	92-99	92-98	90-97	88-94
		Cork, ..	-	-	-	-	-
FRANCE, ..	12 x 2lb. rolls,	London, ..	Per doz. lbs. 11-14	Per doz. lbs. 11-14	Per doz. lbs. 11-14	Per doz. lbs. 11-14	Per doz. lbs. 11-14
	Paris baskets,	do., ..	Per cwt. 112-120	Per cwt. 112-120	Per cwt. 112-120	Per cwt. 112-120	Per cwt. 112-120
	do., ..	do., ..	112-120	112-120	112-120	112-120	112-120
DENMARK AND SWEDEN.	Kieis, ..	Copenhagen Quotation,	97 Kr. 108/9 per 50 Kilos.	99 Kr. 110/11 per 50 Kilos.	99 Kr. 110/11 per 50 Kilos.	99 Kr. 110/11 per 50 Kilos.	97 Kr. 108/7 per 50 Kilos.
		Average over- price.	-	-	-	-	-
		London, ..	115-117	117-119	117-119	117-119	114-116
		Liverpool, ..	116-121	116-120	119-124	118-124	116-122
		Bristol, ..	-	-	-	-	-
		Cardiff, ..	119-121	119-120	120-121	119-121	121-122
		Manchester, ..	116-119	116-121	117-121	117-121	116-120
		Birmingham, ..	117-119	117-119	118-122	118-121	117-120
		Newcastle-on- Tyne, ..	116-118	116-118	118-120	118-120	116-119
		Glasgow, ..	116-117	116-117	118-119	118-119	117-118
		Leith, ..	115-116	116	118-118/6	118	117-118
		Hull, ..	115-117	116	116-118	117-118	117-119
		F. O. R. London	-	-	-	-	-
	1lb. rolls, 10 x 24 lbs. boxes.	London, ..	-	-	-	-	-
		do., ..	-	-	-	-	-
		do., ..	-	-	-	-	-
FINLAND, ..	Kieis, ..	Manchester, ..	114-116	114-119	116-118	116-118	114-118
		Liverpool, ..	-	-	-	-	-
		Hull, ..	113	114	114-115	114-116	114-116
		Cardiff, ..	116-117	116	117	116-117	118

ENDED 31st DECEMBER, 1910.

"GROCERS' GAZETTE," AND OTHER TRADE REPORTS.

Landed Prices of the Choicest Qualities. The Nett F.O.R. Price to the landed Prices in Great Britain. This figure covers handling, &c.

WEEK ENDED									
NOVEMBER.					DECEMBER.				
5th	12th	19th	26th	3rd	10th	17th	24th	31st	
Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	
104-112	104-110	104-110	106-110	106-110	110-112	110-112	111-116	111-115	
108-114	106-110	107-110	112-114	112-114	110-112	110-112	111-118	111-115	
110-114	110-114	110-114	112-114	112-114	112-114	112-114	111-118	111-115	
113-114	112	114	112-114	112-114	116-117	115	111-118	111-115	
109-114	106-112	108-115	112-118	111-117	112-117	111-116	111-118	111-115	
111-113	109-112	111-113	112-116	112-114	112-113	112-113	111-118	111-115	
111-112	109-110	110-112	111-113	112-113	110-112	110-112	111-118	111-115	
-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	
109-112	110-112	112	114/4-116 8	114/4-116 8	114 4-116 8	116-119	116-121	112-116	
119 126	118 10 130 8	117 10 130 8	119/3-130 8	119 4-130 8	120 1-130 8	121 6-130 8	122 6 135 4	119-135/4	
92-100	92-98	90-98	92-100	90-98	92-100	94-98	-	94-98	
100-102	100	100-102	100	98-102	96-100	95-98	96-100	94-98	
102	102	100-102	100-102	98-102	98-102	100	94-102	91-102	
98-102	96-98	98-104	100	96-100	96	95	-	-	
91-92	90-91	91	91-92	92-95	95-100	100	100	102-103	
88-89	84-87	86-90	88-90	87-88	88-89	90-94	91-96	93-96	
87	85-86	87	86-87	84-86	84-86	85-86	83-84	83-85	
88-94	86-93	86-93	87-96	86-98	87-105	88-105	88-102	87-107	
Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	
11-14	11-14	11-14	11/6-14/6	11/6-14/6	12-15	12-15	12-15	12-15	
Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	
112-118	112-118	112-118	116-122	116-122	120-126	120-126	120-126	120-126	
95 Kr. } 106/5 per } = per 50 } cwt Kilos }	97 Kr. } 108/8 per } = per 50 } cwt Kilos }	99 Kr. } 110/10 per } = per 50 } cwt Kilos }	99 Kr. } 110/10 per } = per 50 } cwt Kilos }	99 Kr. } 110/10 per } = per 50 } cwt Kilos }	99 Kr. } 111/- per } = per 50 } cwt Kilos }	99 Kr. } 111/- per } = per 50 } cwt Kilos }	97 Kr. } 108/9 per } = per 50 } cwt Kilos }	95 Kr. } 106/5 per } = per 50 } cwt Kilos }	
112-114	114-116	116-119	116-119	116-118	116-118	116-118	114-116	112-114	
114-120	116-119	117-122/6	119-123	118-123	117-123	117-124	120-123	117-121	
118-120	115-116/6	121-122	121-123	121-123	120-121	121-122	120-122	118-119	
113-118	114-120	117-123	118-121	116-121	116-120	116-120	117-120	114-118	
115-117	114-116	117-120	119-122	118-122	116-121	117-121	117-120	116-118	
112-115	112-114	116-118	117-119	116-118	115-117	116-118	117-118	114-116	
115-116	115-116	119-120	120-121	119-120	118-119	118-119	117-118	115-117	
114/6	-	116-117	119-120	118	116-118	116-118	117-118	114-115	
114-116	114	116-120	117	117	117	117	114-118	114-117	
-	-	-	-	-	-	-	-	-	
113-115	112-117	114-119	117-119	115-118	115-117	115-118	115-118	113-116	
113-115	111-112	112-116	115	114-115	113-115	114-116	115-117	113-115	
116-116	112	118	117-118	118-119	117	118	117-118	115	

(Continued on Pages 400-401.)

BUTTER PRICES DURING THE QUARTER

ABSTRACTED FROM "THE GROCER," "GROCER'S REVIEW,"

Excepting 1 lb. Rolls and Farmers' Butter all quotations are the
an Irish Creamery would be 5s. to 7s. per cwt. less than
freight, commission,

COUNTRY OF ORIGIN.	Type of Package.	Place of Sale.	WEEK ENDED.				
			OCTOBER.				
			1st.	8th	15th	22nd	29th
RUSSIA AND SIBERIA.	Kieles.	London, ..	Per cwt. s. s. 104-108	Per cwt. s. s. 104-108	Per cwt. s. s. 104-108	Per cwt. s. s. 102-106	Per cwt. s. s. 102-106
		Liverpool, ..	104-110	104-108	107-109	106-108	106-108
		Bristol, ..	106-110	104-110	106-110	108-110	107-110
		Cardiff, ..	104-107	106-112	106-112	104-111	102-110
		Manchester, ..	105-110	106-112	108-110	108-110	108-110
		Birmingham, ..	103-108/6	103-109	103-111	102-110	102-108
		Glasgow, ..	106-108	106-108	106-108	106-108	105-106
		Leith, ..	104	104	104	104	-
		Hull, ..	-	-	-	-	-
		-	-	-	-	-	-
HOLLAND, ..	Boxes, ..	London, .	114-115	114-116	116	114-116	114
	Rolls, ..	do., ..	Per doz lbs. 13-13/6	Per doz lbs. 13-13/6	Per doz lbs. 13-6-11	Per doz lbs. 13/6-14	Per doz lbs. 13/6-14
	Boxes, ..	Glasgow—	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.
		Fresh, ..	113-114	116-117	118-120	118-120	117-119
		Salt, ..	108-110	111-112	115-116	115-116	114-115
		Manchester, ..	-	-	-	-	-
ITALY, ..	Rolls, ..	London, ..	Per doz lbs. 13-14	Per doz lbs. 13-14	Per doz lbs. 13-14	Per doz lbs. 13-14	Per doz lbs. 13-14
	50lb. boxes,	London, ..	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.
CANADA, ..	50lb. boxes,	Liverpool, ..	113-115	113-116	114-116	112-114	110-112
		Bristol, ..	114-118	114-118	114-118	114-118	113-118
		Cardiff, ..	115-116	114-116	116-118	115-118	112-116
		Birmingham, ..	-	-	-	-	-
		Manchester, ..	-	-	-	-	-
		Glasgow, ..	-	-	-	-	-
AUSTRALIA AND NEW ZEALAND.*	Boxes, .	London, ..	A. s. 110-116 u. 114-116	A. s. 110-116 u. 114-116	A. s. 110-114 u. 112-116	A. s. 106-112 u. 112-116	A. s. 104-110 u. 110-114
		Liverpool, ..	Z. -	Z. -	Z. -	Z. -	Z. 108-112
		Bristol, ..	A. -	A. -	A. -	A. -	A. -
		Cardiff, ..	Z. -	Z. -	Z. -	Z. -	Z. -
		Manchester, .	A. 112	A. 114	A. 110-114	A. 108-114	A. 110-114
		Birmingham, .	Z. 116-120	Z. 116-120	Z. 116-120	Z. 116-120	Z. 112-120
		Glasgow, ..	A. -	A. -	A. -	A. -	A. 112
		Leith, ..	Z. -	Z. -	Z. 118	Z. 115-116	Z. 112-116
		Hull, ..	A. -	A. -	A. -	A. -	A. -
		-	Z. -	Z. -	Z. -	Z. -	Z. -
		-	A. -	A. -	A. -	A. -	A. -
		-	Z. -	Z. -	Z. -	Z. -	Z. -
		-	A. -	A. -	A. -	A. -	A. -
		-	Z. -	Z. -	Z. -	Z. -	Z. -
ARGENTINA, ..	Boxes, ..	London, ..	-	-	-	-	-
		Liverpool, ..	-	-	-	-	-
		Bristol, ..	-	-	-	-	-
		Cardiff, ..	-	-	-	-	-
		Manchester, ..	-	-	-	-	-
		Birmingham, ..	-	-	-	-	-
UNITED STATES	Tubs & boxes,	Glasgow, ..	-	-	114	114	112
		London, ..	-	-	-	-	-
		Liverpool, ..	-	-	-	-	-
		Bristol, ..	-	-	-	-	-
		Cardiff, ..	-	-	-	-	-
		Manchester, ..	-	-	-	-	-

ENDED 31ST DECEMBER, 1910,—continued.

"GROCCERS' GAZETTE," AND OTHER TRADE REPORTS.

Landed Prices of the Choicest Qualities. The Nett F.O.B. Price to the landed Prices in Great Britain. This figure covers handling, &c.

[illegible]

TABLES SHOWING THE EXPORTS

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT
the PORTS of EMBARKATION

IRISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ballina, . . .	86	20	-	-	158	-	264	283	-	-	283
Belfast, . . .	7,749	32,457	1,989	1,888	136	135	44,354	4,978	165	87	5,230
Coleraine, . . .	32	58	-	-	1	-	91	44	-	-	44
Cork, . . .	3,171	12,928	1,390	2,518	1,711	13,553	35,280	7,942	747	-	8,689
Drogheda, . . .	8,409	9,663	71	3	-	5	18,151	6,656	-	-	6,656
Dublin, . . .	65,859	40,457	8,879	1,618	1,971	5,079	123,863	73,922	-	-	73,922
Dundalk, . . .	1,054	8,991	85	140	-	-	10,270	8,812	-	-	8,812
Dundrum, . . .	-	-	-	-	-	-	-	-	-	-	-
Greenore, . . .	97	4,871	336	590	-	4	5,898	4,572	-	-	4,572
Larne, . . .	73	5,202	-	49	-	628	5,952	-	100	-	100
Limerick, . . .	39	279	-	-	1,457	84	1,859	-	-	-	-
Londonderry, . . .	832	14,487	285	939	280	2,156	18,989	2,522	1,155	1,949	5,626
Milford, . . .	-	47	-	-	1	-	48	-	-	30	30
Mulroy, . . .	-	20	-	-	4	-	24	7	-	1	8
Newry, . . .	53	2,501	12	4	-	-	2,570	1,611	-	-	1,611
Portrush, . . .	24	114	-	2	-	-	140	-	-	-	-
Rosslare, . . .	-	-	-	-	-	-	-	1	-	-	1
Silgo, . . .	335	280	-	2	268	-	865	1,252	-	1,606	2,918
Warrenpoint, . . .	-	-	-	-	-	-	-	-	-	-	-
Waterford, . . .	5,980	20,836	53	156	384	1,753	29,168	10,335	-	-	10,335
Westport, . . .	328	-	-	12	263	-	603	3,207	-	-	3,207
Wexford, . . .	210	93	-	-	-	-	303	6,467	-	-	6,467
TOTAL, . . .	94,337	153,281	13,119	7,921	6,634	23,397	298,692	132,671	2,167	3,733	138,571

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT
the PORTS of DEBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ardrossan, . . .	1,919	6,214	986	447	24	1	9,591	67	1	-	68
Ayr, . . .	2,117	14,437	277	286	73	137	17,327	75	100	64	239
Barrow, . . .	31	326	40	218	-	-	624	67	58	-	125
Bristol, . . .	433	5,723	189	258	-	2,715	9,316	2,181	295	-	2,476
Cardiff, . . .	-	-	-	-	-	-	-	-	-	-	-
Fishguard, . . .	3,756	18,168	1,051	1,636	58	8,981	33,650	7,610	250	-	7,860
Fleetwood, . . .	411	3,202	284	114	-	28	4,039	2,039	136	136	2,311
Glasgow, . . .	14,093	29,522	815	1,181	4,146	4,640	54,403	1,082	12	519	1,598
Greenock, . . .	513	3,453	-	47	-	-	4,013	-	-	-	-
Heysham, . . .	1,839	12,433	1,568	516	34	85	16,475	1,460	803	-	2,268
Holyhead, . . .	13,375	18,463	1,598	904	326	2,112	36,778	25,724	-	-	25,724
Liverpool, . . .	43,394	35,585	6,273	2,156	1,972	3,338	93,218	85,007	512	3,014	88,533
London, . . .	-	2	-	-	-	-	2	-	-	-	-
Manchester, . . .	7,597	90	7	2	1	-	7,697	7,080	-	-	7,080
Newhaven, . . .	-	57	-	-	-	-	57	-	-	-	-
Plymouth, . . .	881	-	-	-	-	694	1,575	-	-	-	-
Portsmouth, . . .	-	-	1	-	-	-	1	-	-	-	-
Preston, . . .	431	-	-	-	-	-	431	-	-	-	-
Silloth, . . .	2,948	1,040	1	-	-	1	3,990	299	-	-	299
Southampton, . . .	26	190	20	115	-	98	444	-	-	-	-
Stranraer, . . .	78	4,376	-	46	-	566	5,061	-	-	-	-
Whitehaven, . . .	-	-	-	-	-	-	-	-	-	-	-
TOTAL, . . .	94,337	153,284	13,119	7,921	6,634	23,397	298,692	132,671	2,167	3,733	138,571

AND IMPORTS OF ANIMALS.

I.

BRITAIN during the Three Months ended 31st DECEMBER, 1910, showing in Ireland.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals	IRISH PORTS.
Fat.	Stores.	Total.		Stallions.	Mares.	Geldings.	Total.				
168	-	168	-	-	-	-	-	-	-	715	Ballina.
3,264	381	3,645	3	3	486	685	1,174	-	2	54,408	Belfast.
6	-	6	-	-	2	-	2	-	1	144	Coleraine.
6,003	-	6,003	-	-	144	287	431	-	50	50,453	Cork.
1,237	186	1,423	3	-	6	12	18	-	-	26,251	Drogheda.
90,156	102	90,258	6	27	1,112	1,056	2,195	3	13	290,320	Dublin.
7,898	674	8,572	21	-	98	82	180	-	1	27,856	Dundalk.
-	-	-	-	-	-	-	-	-	-	-	Dundrum.
2,340	150	2,496	3	-	757	503	1,260	-	1	14,230	Greenore.
56	22	78	-	1	55	77	133	-	1	6,264	Larne.
-	-	-	-	-	-	-	-	-	-	1,859	Limerick.
1,973	16	1,989	-	1	26	34	61	-	7	26,672	Londonderry.
213	-	213	-	-	-	-	-	-	-	291	Milford.
367	-	357	-	-	-	-	-	-	1	390	Mulroy.
621	-	621	-	-	4	5	9	-	1	4,812	Newry.
9	-	9	-	-	-	1	1	-	-	150	Portrush.
8,431	45	8,476	2	-	14	29	43	-	2	50	Rosslare.
-	-	-	-	-	1	-	1	-	1	12,261	Silgo.
8,264	-	8,264	-	10	287	389	686	1	-	-	Warrenpoint.
3,173	-	3,173	-	-	1	-	1	-	-	48,454	Waterford.
2,149	-	2,149	-	-	1	-	1	-	-	6,984	Westport.
-	-	-	-	-	-	-	-	-	-	8,920	Wexford.
136,324	1,578	137,902	38	42	2,994	3,160	6,196	4	81	581,484	TOTAL.

II.

BRITAIN during the Three Months ended 31st DECEMBER, 1910, showing in GREAT BRITAIN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	BRITISH PORTS.
Fat.	Stores.	Total.		Stallions.	Mares.	Geldings.	Total.				
26	64	90	1	1	38	120	159	-	-	9,909	Ardrossan.
248	339	587	1	1	10	23	34	-	-	18,188	Ayr.
2,474	-	2,474	-	-	1	1	2	-	-	3,225	Barrow.
3,473	-	3,473	-	-	26	70	95	-	1	15,361	Bristol.
-	-	-	-	-	-	-	-	-	-	-	Cardiff.
3,543	2	3,645	2	8	395	552	955	-	4	46,116	Fishguard.
848	10	858	-	-	251	210	470	-	-	7,678	Fleetwood.
5,748	-	5,748	-	3	145	248	396	-	11	62,151	Glasgow.
4	2	6	-	-	4	5	9	-	-	4,028	Greenock.
11,968	14	11,982	-	-	120	178	298	-	-	31,018	Heysham.
67,022	150	67,172	3	24	1,487	1,204	2,715	1	2	132,395	Holyhead.
40,124	981	41,105	31	3	379	347	729	1	60	223,677	Liverpool.
-	-	-	-	-	2	2	4	-	-	6	London.
184	-	184	-	1	55	51	107	1	-	15,069	Manchester.
-	-	-	-	-	-	5	5	1	-	63	Newhaven.
20	-	20	-	-	15	36	51	-	1	1,647	Plymouth.
-	-	-	-	-	-	-	-	-	-	1	Portsmouth.
51	-	51	-	-	-	2	2	-	-	484	Preston.
392	-	392	-	-	9	13	22	-	1	4,704	Silloth.
85	-	85	-	-	3	7	10	-	-	539	Southampton.
14	16	30	-	1	55	77	133	-	1	5,225	Stranraer.
-	-	-	-	-	-	-	-	-	-	-	Whitehaven.
136,324	1,578	137,902	38	42	2,994	3,160	6,196	4	81	581,484	TOTAL.

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT
the PORTS OF

IRISH PORTS.	CATTLE							SHEEP			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ballina,	-	-	-	-	-	-	-	-	-	-	-
Belfast,	-	25	2	7	-	5	39	725	7,310	79	8,114
Coleraine,	-	-	-	-	-	-	-	4	-	-	4
Cork,	-	1	1	-	-	1	3	-	2	-	2
Drogheda,	-	-	-	-	-	-	-	-	-	-	-
Dublin,	-	50	4	10	-	5	60	453	3,817	242	4,512
Dundalk,	-	-	-	-	-	-	-	-	-	-	-
Dundrum,	-	-	-	-	-	-	-	-	-	-	-
Greenore,	-	-	-	-	-	-	-	-	-	-	-
Larne,	-	6	10	-	-	4	20	28	1,758	207	1,983
Limerick,	-	-	-	-	-	-	-	-	-	-	-
Londonderry,	-	4	-	-	-	-	4	-	238	311	549
Milford,	-	-	-	-	-	-	-	-	-	-	-
Mutroy,	-	-	-	-	-	-	-	-	74	1	75
Newry,	-	-	-	-	-	-	-	-	197	-	197
Portrush,	-	-	-	-	-	-	-	-	3	45	48
Rosslare,	-	-	-	-	-	-	-	-	1	-	1
Sligo,	-	-	-	-	-	-	-	-	50	-	50
Warrenpoint,	-	-	-	-	-	-	-	-	-	-	-
Waterford,	-	3	-	-	-	2	5	-	202	-	202
Westport,	-	1	-	-	-	-	1	-	-	-	-
Wexford,	-	-	-	-	-	-	-	-	-	20	20
TOTAL,	-	90	17	17	-	17	141	1,210	13,632	905	15,767

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT
the PORTS OF EMBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ardrossan,	-	19	-	-	-	5	24	545	2,471	79	3,095
Ayr,	-	-	2	6	-	4	12	176	5,024	148	6,248
Barrow,	-	-	-	-	-	-	-	-	-	-	-
Bristol,	-	-	-	-	-	-	-	-	-	-	-
Cardiff,	-	-	-	-	-	-	-	-	-	-	-
Flahguard,	-	1	-	-	-	-	1	-	1	-	1
Fleetwood,	-	-	-	-	-	-	-	-	1	-	1
Glasgow,	-	17	1	-	-	5	23	36	3,657	514	4,207
Greenock,	-	2	-	3	-	-	5	-	188	85	253
Heysham,	-	1	-	1	-	-	2	-	-	-	-
Holyhead,	-	17	4	-	-	1	22	-	11	-	11
Liverpool,	-	3	-	-	-	-	8	-	1	20	21
London,	-	1	-	-	-	-	1	-	6	-	6
Manchester,	-	-	-	-	-	-	-	-	-	-	-
Newhaven,	-	-	-	-	-	-	-	-	-	-	-
Plymouth,	-	-	-	-	-	-	-	-	-	-	-
Freston,	-	-	-	-	-	-	-	-	-	-	-
Sliloth,	-	23	-	-	-	-	23	453	650	-	1,103
Southampton,	-	-	-	7	-	2	9	-	-	-	-
Stanraer,	-	6	10	-	-	-	16	-	762	59	821
Whitehaven,	-	-	-	-	-	-	-	-	-	-	-
TOTAL,	-	90	17	17	-	17	141	1,210	13,652	905	15,767

III.

BRITAIN during the Three Months ended 31st DECEMBER, 1910, showing
DEBARKATION IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
-	-	-	-	-	-	-	-	-	-	-	Ballina.
-	6	6	2	4	47	60	117	4	-	8,282	Beltast.
-	-	-	1	2	58	66	126	-	-	4	Coleraine.
-	-	-	-	-	1	1	2	-	-	132	Cork.
-	7	7	1	45	229	197	471	-	2	5,082	Drogheda.
-	-	-	-	-	3	2	5	-	-	2	Dublin.
-	-	-	-	-	-	-	-	-	-	5	Dundalk.
-	1	1	-	1	91	68	160	-	-	161	Dundrum.
-	-	-	-	2	16	20	38	-	-	2,051	Greenore.
-	-	-	-	-	-	-	-	-	-	-	Larne.
-	-	-	-	-	-	-	-	-	-	-	Limerick.
-	-	-	-	1	4	4	9	-	-	562	Londonderry.
-	-	-	-	-	-	-	-	-	-	-	Milford.
-	-	-	-	-	-	-	-	-	-	75	Mulroy.
-	-	-	-	-	-	-	-	-	-	197	Newry.
-	-	-	-	-	1	-	1	-	-	49	Portrush.
-	-	-	2	-	5	13	18	-	-	21	Rosslare.
-	-	-	-	-	-	-	-	-	-	50	Sligo.
-	-	-	-	-	-	-	-	-	-	-	Warrenpoint.
-	-	-	-	5	46	50	110	-	-	317	Waterford.
-	-	-	-	-	-	-	-	-	-	1	Westport.
-	1	1	-	-	2	2	4	-	-	25	Wexford.
-	15	15	6	60	503	498	1,061	4	2	16,996	TOTAL.

IV.

BRITAIN during the Three Months ended 31st DECEMBER, 1910, showing
in Great Britain.

SWINE.			Goats.	HORSES				Mules or Jennets.	Asses.	Total Animals.	BRITISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
-	3	3	-	-	11	9	20	-	-	3,142	Ardrossan.
-	-	-	-	2	7	8	17	-	-	6,277	Ayr.
-	-	-	-	-	1	1	2	-	-	2	Barrow.
-	1	1	-	2	51	47	100	-	-	101	Bristol.
-	-	-	-	-	-	-	-	-	-	-	Cardiff.
-	-	-	2	5	46	78	129	-	-	133	Fishguard.
-	2	2	-	-	12	16	28	-	-	31	Fleetwood.
-	7	7	2	2	26	41	69	4	-	4,312	Glasgow.
-	-	-	-	-	1	4	5	-	-	263	Greenock.
-	-	-	-	-	2	11	13	-	-	15	Reyshan.
-	1	1	1	42	280	207	529	-	2	566	Holyhead.
-	1	1	1	5	37	45	87	-	-	113	Liverpool.
-	-	-	-	-	-	-	-	-	-	7	London.
-	-	-	-	-	-	1	1	-	-	1	Manchester.
-	-	-	-	-	-	-	-	-	-	-	Newhaven.
-	-	-	-	-	5	4	9	-	-	9	Plymouth.
-	-	-	-	-	-	-	-	-	-	-	Preston.
-	-	-	-	-	9	6	15	-	-	1,141	Sliloth.
-	-	-	-	-	-	-	-	-	-	9	Southampton.
-	-	-	-	2	15	20	37	-	-	874	Stranraer.
-	-	-	-	-	-	-	-	-	-	-	Whitehaven.
-	15	15	6	60	503	498	1,061	4	2	16,996	TOTAL

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, .	-	18	-	-	18	-	-	-
DUBLIN, .	325	26	-	-	351	31	-	31
TOTAL, .	325	44	-	-	369	31	-	31

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the
showing the PORTS of DEBARKATION

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, .	325	44	-	-	369	31	-	31

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, .	-	-	-	-	-	-	-	-
DUBLIN, .	-	-	-	-	-	-	-	-
TOTAL, .	-	-	-	-	-	-	-	-

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the
showing the PORTS of EMBARKATION

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, .	-	-	-	-	-	-	-	-

**ISLE OF MAN during the Three Months ended 31st DECEMBER, 1910,
EMBARKATION in IRELAND.**

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stallions.	Mares.	Geldings.	Total.				
-	-	-	-	-	-	1	1	-	-	19	BELFAST. DUBLIN.
-	1	1	-	-	-	-	-	-	-	383	
-	1	1	-	-	-	1	1	-	-	402	TOTAL.

ISLE OF MAN during the Three Months ended 31st DECEMBER, 1910,
in the ISLE OF MAN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stallions.	Mares.	Geldings.	Total.				
-	1	1	-	-	-	1	1	-	-	402	DOUGLAS.

ISLE OF MAN during the Three Months ended 31st DECEMBER, 1910,
DEBARKATION in IRELAND.

[illegible]

ISLE OF MAN during the Three Months ended 31st DECEMBER, 1910,
in the ISLE OF MAN.

[illegible]

COASTING AND

RETURN of the NUMBER of ANIMALS SHIPPED to and from Places in
the Places of Embarkation

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Cork to Aghada Pier, .	-	-	-	-	-	-	-	-	-	-	-
" to Belfast, " .	-	35	2	-	37	-	-	-	-	-	-
" to Spike Island, .	-	-	-	-	-	-	-	-	-	-	-
" to Queenstown, .	-	-	-	3	3	-	-	-	-	-	-
" to Waterford, .	-	-	-	-	-	-	-	-	-	-	-
Total, . . .	-	35	2	3	40	-	-	-	-	-	-
Aghada Pier to Cork, .	-	-	-	-	-	27	-	27	50	-	50
Belfast, " .	-	-	-	-	-	-	-	-	-	-	-
Spike Island " .	-	-	-	-	-	-	-	-	4	-	4
Queenstown " .	-	-	-	-	-	-	-	-	52	-	52
Waterford " .	-	-	-	-	-	-	-	-	-	-	-
Total, . . .	-	-	-	-	-	27	-	27	106	-	106
Waterford to Ballyhack	-	-	-	-	-	-	-	-	-	-	-
" to Belfast, .	-	-	-	-	-	-	-	-	-	-	-
" to Duncannon, .	-	72	13	15	100	4	-	4	-	6	6
Total, . . .	-	72	13	15	100	4	-	4	-	6	6
Ballyhack to Waterford	16	6	-	-	22	18	-	18	2	-	2
Limerick to Kilrush .	-	-	-	-	-	-	-	-	-	-	-
Duncannon to Waterford	18	22	1	-	41	-	-	-	238	-	238
Kilrush to Limerick, .	-	208	-	-	208	-	-	-	1,566	-	1,566
Banagher " .	-	-	-	-	-	-	-	-	-	-	-
Glin, " .	-	-	-	-	-	-	-	-	-	-	-
Portumna, " .	-	-	-	-	-	-	-	-	-	-	-
Kildysart, " .	-	-	-	-	-	-	-	-	-	-	-
Kilkee, " .	-	-	-	-	-	-	-	-	-	-	-
Total, . . .	-	208	-	-	208	-	-	-	1,566	-	1,566
Greencastle to Greenore	-	-	-	-	-	-	-	-	-	-	-
Greenore to Greencastle	-	-	-	-	-	-	-	-	-	-	-
Londonderry to Moville	2	-	-	-	2	1	-	1	-	-	-
Moville to Londonderry	1	127	-	-	128	10	-	10	6	-	6
Ballina to Sligo, .	-	-	1	-	1	32	-	32	-	1	1
Belmullet " .	3	4	-	14	21	37	48	85	388	-	388
Total, . . .	3	4	1	14	22	69	48	117	388	1	389
Mulroy to Milford, .	-	-	-	-	-	-	-	-	-	-	-
Leithbeg to Mulroy, .	-	1	-	-	1	-	-	-	-	-	-
Milford to Mulroy, .	-	-	-	-	-	-	-	-	24	-	24
Mulroy to Portrush, .	-	-	-	-	-	-	-	-	-	-	-
Londonderry to Mulroy	-	-	-	-	-	-	-	-	-	-	-
Total, . . .	40	475	17	32	564	129	48	177	2,380	7	2,387

INLAND NAVIGATION.

Ireland during the Three Months ended 31st DECEMBER, 1910, showing
and Debarkation.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
-	-	-	-	-	-	-	-	Cork to Aghada Pier.
-	-	-	-	-	-	-	37	" to Belfast.
-	-	-	-	-	-	-	-	" to Spike Island.
-	-	-	-	-	-	-	3	" to Queenstown.
-	-	-	-	-	-	-	-	" to Waterford.
-	-	-	-	-	-	-	40	Total.
-	-	-	-	-	-	-	77	Aghada Pier to Cork.
-	-	1	-	1	-	-	1	Belfast "
-	-	-	-	-	-	-	4	Spike Island "
-	-	-	-	-	-	-	52	Queenstown "
-	-	-	-	-	-	-	-	Waterford "
-	-	1	-	1	-	-	134	Total.
-	-	-	-	-	-	-	-	Waterford to Ballyhack.
-	-	2	2	4	1	5	120	" to Belfast.
-	-	2	2	4	1	5	120	" to Duncannon.
-	-	-	-	-	-	-	-	Total.
-	-	-	-	-	-	-	42	Ballyhack to Waterford.
-	-	-	-	-	-	-	-	Limerick to Kilrush.
-	-	-	-	-	-	-	279	Duncannon to Waterford.
-	-	-	-	-	-	-	1,774	Kilrush to Limerick.
-	-	-	-	-	-	-	-	Banagher "
-	-	-	-	-	-	-	-	Chin "
-	-	-	-	-	-	-	-	Portumna "
-	-	-	-	-	-	-	-	Kildysart "
-	-	-	-	-	-	-	-	Kilkee "
-	-	-	-	-	-	-	1,774	Total.
-	-	-	-	-	-	-	-	Greencastle to Greenore.
-	-	-	-	-	-	-	-	Greenore to Greencastle.
-	-	-	-	-	-	-	3	Londonderry to Moville.
-	-	-	-	-	-	-	144	Moville to Londonderry.
-	-	-	-	-	-	-	34	Dallina to Sligo.
-	-	-	-	-	-	-	494	Belmullet "
-	-	-	-	-	-	-	528	Total.
-	-	-	-	-	-	-	-	Mulroy to Milford.
-	-	-	-	-	-	-	1	Leithbeg to Mulroy.
-	-	-	-	-	-	-	24	Milford to Mulroy.
-	-	-	-	-	-	-	-	Mulroy to Portrush.
-	-	-	-	-	-	-	-	Londonderry to Mulroy.
-	-	8	2	5	1	5	3,080	Total.

RETURN of the NUMBER of HORSES EXPORTED from IRELAND through GREAT BRITAIN to the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 31st DECEMBER, 1910, showing the Ports of Embarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast,	—	187	87	274
Cork,	—	—	—	—
Dublin,	1	158	111	270
Dundalk,	—	62	21	83
Greenore,	—	390	199	589
Waterford,	2	13	46	61
Total,	3	810	464	1,277

RETURN of the NUMBER of HORSES IMPORTED into IRELAND through GREAT BRITAIN from the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 31st DECEMBER, 1910, showing the Ports of Debarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast,	—	5	6	11
Dublin,	—	2	—	2
Waterford,	—	2	2	4
Total,	—	9	8	17

RETURN of the NUMBER of HORSES IMPORTED into IRELAND direct from FOREIGN COUNTRIES during the THREE MONTHS ended 31st DECEMBER, 1910, showing the Ports of Debarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Dublin,	—	—	—	—
Portrush,	—	—	—	—
Total,	—	—	—	—

EMIGRATION FROM IRELAND.

TABLE showing, by Destinations, the Numbers of Emigrants (Natives of Ireland) who left the Ports of Ireland during the months of October, November, and December, 1910, and the total for the Twelve Months ended the 31st December, 1910, together with the total Number of Emigrants in each of the corresponding periods of the year 1909.

DESTINATION.	October, 1910.	November, 1910.	December, 1910.	Twelve Months ended 31st December, 1910.
FOREIGN COUNTRIES :—				
America (U.S.),	2,745	783	225	24,905
Canada,	336	101	35	4,416
South Africa,	12	14	7	165
Australia,	39	55	27	613
New Zealand,	18	33	23	179
Other Countries,	3	1	3	83
Total,	3,153	987	320	30,361
GREAT BRITAIN :—				
England and Wales,	137	111	85	1,656
Scotland,	32	25	18	440
Total,	169	136	103	2,096
General Total for 1910,	3,322	1,123	423	32,457
General Total for 1909,	2,799	1,177	633	28,676

The figures are subject to revision in the Annual Report.

The figures in the above Table have been extracted from the Returns published by the Registrar-General for Ireland.

ACCOUNT showing the QUANTITIES of certain kinds of AGRICULTURAL
into Ireland in each WEEK from

ARTICLES.	WEEK ENDED.				
	1st Oct.	8th Oct.	15th Oct.	22nd Oct.	29th Oct.
ANIMALS LIVING—					
Horses, No.	—	—	—	—	—
FRESH MEAT—					
Beef (including refrigerated and frozen), cwt.	—	—	3,012	—	—
Mutton, "	—	—	1,530	—	—
Pork, "	—	—	60	—	—
Unenumerated, "	—	—	—	—	—
SALTED OR PRESERVED MEAT—					
Bacon, cwt.	30	—	38	48	36
Beef, "	—	70	—	—	—
Hams, "	—	3	—	—	—
Pork, "	160	79	640	—	—
Meat, unenumerated, Salted cwt.	—	—	—	—	—
Meat, preserved otherwise than by salting (including tinned and canned), . . . cwt.	13	72	—	—	—
DAIRY PRODUCE AND SUBSTITUTES—					
Butter, cwt.	—	2	—	—	—
Margarine, "	48	153	86	65	97
Cheese, "	—	4	—	—	1,305
Milk, Condensed, . . . "	32	43	56	81	46
" Cream, "	—	—	—	—	—
" Preserved, other kinds "	—	—	—	—	—
EGGS, gt. hunds.	—	828	1,236	828	664
LARD, cwt.	22	—	8	6	42
CORN, GRAIN, MEAL AND FLOUR—					
Wheat, cwt.	121,500	135,800	170,000	—	8,100
Wheat Meal and Flour, . . "	3,100	5,100	28,300	24,100	7,000
Barley, "	—	8,400	—	—	54,700
Oats, "	—	—	—	—	—
Peas, "	70	30	20	40	90
Beans, "	—	—	—	—	—
Maize or Indian Corn, . . "	356,400	238,400	108,200	339,000	201,100
FRUIT, RAW—					
Apples, "	—	—	—	—	—
Currants, "	—	—	—	—	—
Gooseberries, "	—	—	—	—	—
Pears, "	—	—	—	—	—
Plums, "	—	—	—	—	—
Grapes, "	—	—	—	—	—
Lemons, "	—	—	—	—	—
Oranges, "	—	—	—	—	—
Strawberries, "	—	—	—	—	—
Unenumerated, "	—	—	—	—	—
HAY, tons,	—	—	—	—	—
STRAW, "	—	—	—	—	19
MOSS LITTER, "	77	45	45	55	98
HOPS, cwt.	—	—	—	40	—
VEGETABLES, RAW—					
Onions, bushels,	1,229	8,154	1,880	2,752	1,112
Potatoes, cwt.	—	95	—	—	—
Tomatoes, "	—	—	—	—	—
Unenumerated, 2	—	15	7	—	—
VEGETABLES, DRIED, . cwt.					
Preserved by Canning, . . "	62	—	—	—	—
POULTRY AND GAME, . . £	—	—	—	—	—

*This Table is confined to the Imports of certain kinds of Agricultural Produce into
to a request from this Department kindly consented to separate the Irish Imports (direct)
form of Weekly Returns,

PRODUCE Imported direct (i.e., from the Colonies or Foreign Countries)
1st October to 31st December, 1910.*

[illegible]

Ireland from the Colonies and Foreign Countries. The Board of Customs have in answer from those of the United Kingdom, and to supply this Department with them in the

Statistics and Intelligence Branch,
Department of Agriculture
and Technical Instruction for Ireland.

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JOURNAL.

Investigations on Potato Disease—Experiments on the Spraying of Potatoes—Protection against Plant Diseases—Technical Instruction in Newtownards—Salmon and Trout Culture—Tobacco-growing—The Rural Exodus in France—"Bladder-Rust" of Scots Pine—The Warble Fly—Winter Egg Records—National Museum of Science and Art—Official Documents—Notes and Memoranda—Statistical Tables.

ELEVENTH YEAR.

No. 3.

APRIL, 1911.



DUBLIN:

PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE.

To be purchased, either directly or through any Bookseller, from
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PRICE SIXPENCE.

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NOTICE.

*Communications respecting the literary contents of this JOURNAL
should be addressed to the Superintendent of the Statistics and
Intelligence Branch, Department of Agriculture and Technical
Instruction for Ireland, Upper Merrion-street, Dublin.*

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INVESTIGATIONS ON POTATO DISEASES.

(SECOND REPORT).

In 1909 the Department established a temporary station at Clifden, Co. Galway, for the purpose of carrying out investigations on the various diseases to which the potato is subject in this country. An illustrated article giving an account of the first season's work at this station was published in the issue of this *Journal* for January, 1910 (Vol. X., No. 2). The following account deals with the further work which was carried out there during last season.

It may not be superfluous to recall the fact that the locality chosen for the work was one typical of much of the West, in which the soils are naturally poor, being chiefly reclaimed bog or mountain land, and the holdings small, so that the same crop occupies one and the same piece of land much more frequently than is desirable. The land on which the plots at the station are situated is poor, reclaimed bog, and it was chosen on account of the fact that a crop of potatoes grown on one portion of it suffered from a severe attack of "yellowing" during the season of 1908. Work was resumed at the station in April, and was continued until the end of October. The season as a whole can only be described as one unfavourable to the potato crop, owing to the persistent rains, especially during the latter half of July and practically the whole of August. From the point of view of the investigation of diseases, however, this state of things was favourable rather than otherwise, for plenty of opportunity was afforded for observing the various phases of the different diseases that were being studied. These will now be dealt with one by one.

THE ORDINARY "BLIGHT," OR "BLACK BLIGHT."

(*Phytophthora infestans* de Bary.)

This disease still remains the most serious one with which the grower of potatoes has to contend in this country. Very great headway has, however, been made in recent years in efficiently preventing it from producing a really devastating effect, by spraying the crop with Bordeaux or Burgundy mixtures, prepared from copper sulphate with the addition of lime and soda respectively. The investigations carried out during the past summer were instituted chiefly with a

view to ascertaining the comparative values of different spraying mixtures, the number of times it is necessary to use them during the season, and the dates at which the spray should be applied. For these purposes twenty-four plots, each having an area of one square perch, were laid down and planted with "Champion" tubers which had been boxed during the previous autumn and allowed to sprout. The land had borne a crop of potatoes in 1909 and was manured with artificials only, at the rate of 10 cwt. per statute acre, the mixtures used being made up according to the Department's formula. (See Leaflet, No. 38.)

To gain some information on these points six of the plots were sprayed with Burgundy mixture at the rate of 100 gallons per statute acre, the strength used being two per cent., and the application made by a knapsack sprayer in such a way that the lower surfaces of the leaves were to a considerable extent covered with the mixture as well as the upper ones. The following table gives a summary of the results:—

Plot	Application of Spray.	Sprayed on				Total Yield lbs. per perch.	Diseased	Per cent.
		May.	June.	July.	Aug.			
1	Twice, startin early,	31	22	—	—	46	3	6.5
2	Thrice, starting early,	31	22	23	—	58.5	5	8.5
3	Twice, starting late	—	—	15	13	63.5	4.5	7.1
4	Twice, starting at normal time,	—	15	8	—	49	10	20.4
5	Thrice, starting at normal time,	—	15	8	13	54	13	24
6	Once, midway between normal times,	—	—	6	—	58	6.5	11.2

The numbers given in the column headed "Diseased" are the weights in lbs. per sq. perch of the tubers attacked with *Phytophthora*; in each plot there was also a small quantity of tubers affected with *Spongospora*, the weights of which are included in the total yield.

Notes were made during the season on the behaviour of the foliage of the plants in these plots. The early spraying of Plots 1 and 2 caused a distinct but temporary check in the growth of the plants, and its effect was quite lost by about the middle of July. Plot 2 remained green far longer than any of the others, and Plot 3 was the next best in this respect. Blight first made its appearance in these plots on June 22nd, being then found on Plots 3 and 6. Plots 4

and 5 became attacked during the first few days of July, and Plots 1 and 2 on July 11th. The main and general attack of blight on the plots at the station began about the middle of July, and was favoured by the prevalence of continuous wet and warm weather. In Plot 5 the foliage was already seriously destroyed before the third application of the spray, so that this latter was of little use.

It is not an easy matter to correlate observations made on the extent of damage done to the foliage by *Phytophthora* with the total yield and the yield of diseased tubers, nevertheless Plots 2 and 3, which remained green longest, gave the best yields. These are closely followed by Plot 6, and it is difficult to explain why this should be so. It does not seem to be possible to formulate from the results so far obtained any definite rules as to either the number of sprayings necessary or the times at which the applications should be made. From more general observations made, both on other plots at the station and in the surrounding district, however, some conclusions of a definite character were obtained. Thus it was abundantly clear that spraying to be properly efficient must be carried out *before* *Phytophthora* has made its appearance on the foliage, otherwise the beneficial effect is seriously diminished. Hence it seems advisable to recommend early spraying. Further, it was evident that as regards the times of application of the spray those dates were

**Best Time
for
Spraying.**

best which more or less immediately preceded a spell of wet weather. These periods, so favourable to the spread of the fungus, cannot, however, be foretold with any certainty, and any attempt to fix actual dates for spraying seems to be useless. It was also clear that a single spraying is not sufficient in this district, that a second one is absolutely necessary, and that in many cases a third would be of advantage. On certain plots at the station, connected with Stalk Disease, spraying was commenced on May 31st and continued once a week until August 22nd. The plants on these plots retained a large proportion of green foliage until early in October, whereas that of others in neighbouring plots was completely destroyed long before this. Spraying to this extent would, of course, not be feasible in actual practice, but the results would seem to warrant the conclusion that a third spraying, especially in a particularly wet season, would be of advantage.

**Manner of
Spraying.**

The exact action of the spray in preventing the blight is still a matter of doubt. It is not quite clear whether it acts merely as a protective coating, in which case it is obvious that the better the whole of the surfaces of the plant are covered the more efficient its action will be, or whether the plant actually absorbs some of the material into itself. In the latter case spraying

one side only, preferably the upper for convenience sake, would suggest itself as being sufficient. Two plots were sprayed with fifty gallons of Burgundy mixture each, in the one case the spray being confined to the upper surface of the leaf, and in the other, as far as practicable, to the lower surface only. The results were not satisfactory, the foliage became seriously blighted, and the yield of diseased tubers was very heavy, being over thirty per cent. of the total yield in each case. Possibly the result may be partially due to the fact that only half the quantity of spraying mixture usually employed when both surfaces are being sprayed was used in these two cases.

**Strength of
Spraying
Mixture.**

In the Department's Leaflet, No. 14, which deals with the prevention of potato blight, the quantities recommended are 2 lbs. of copper sulphate per ten gallons of water, with $2\frac{1}{2}$ lbs. of washing soda and 1 lb. of lime, for Burgundy and Bordeaux mixtures respectively, this being equivalent to two per cent. by weight of copper sulphate in each case. It has been suggested from time to time that some saving in cost might accrue if the mixtures contained a lesser proportion of copper sulphate than this, with, of course, a correspondingly less amount of soda or lime. Two plots were therefore devoted to this question, both being sprayed twice with Burgundy mixture, containing in one case one and a half per cent. and in the other one per cent. of copper sulphate. The spray was applied at the rate of one hundred gallons per statute acre to each plot. Up to the third week in July the foliage on these two plots looked extremely well, being only slightly affected with blight, and it was scarcely any, if at all, inferior in appearance to the plot sprayed on the same dates and with the same quantity of a two per cent. mixture. It was, therefore, somewhat surprising that the yield of diseased tubers was so large as it turned out to be. The plot sprayed with the one and a half per cent. mixture produced 55 lbs. of tubers on a square perch, of which 18 lbs., or nearly 33 per cent., were affected with *Phytophthora*. The other plot sprayed with the one per cent. mixture gave a total of $47\frac{1}{2}$ lbs. per square perch, of which 15 lbs., or about 32 per cent., were diseased. The percentages of diseased tubers were therefore very high, about one-third of the yield being diseased in each case—indeed, the percentage yield of diseased tubers in these two plots was higher than in any two others out of the whole twenty-four. Judging from these results, therefore, it would seem unwise to reduce the strength of the copper sulphate employed in making the mixture, but before really conclusive evidence is obtained further trials on a more extended scale and carried over several seasons are necessary.*

* See also the article on p.p. 450 *et seq.*

Four proprietary mixtures were tried, being prepared and applied according to the instructions provided with the materials. In one case the total yield reached 63 lbs. per square perch, with eighteen per cent. of diseased tubers; in the three other cases the yields were less than 50 lbs. per square perch, and the weights of diseased tubers over twenty per cent. in each case. The most recently introduced of these preparations which was experimented with last year for the first time, and proved to be worthless, gave an exactly similar result this season. The particular plot sprayed with this mixture was completely cut down with the blight, and the foliage and stalks entirely destroyed, long before this was the case with any other in the series of twenty-four plots, and one-quarter of the weight of the tubers raised were attacked by the blight. The use of the freshly-prepared Bordeaux and Burgundy mixtures as recommended in the Department's Leaflet is therefore still to be preferred to that of proprietary mixtures.

It was suggested by the late Professor Kelhofer* that by the addition of a small quantity of sugar to Bordeaux mixture its efficacy would be retained for a long time on standing, and that the necessity for making up fresh mixture each time it was required could thus be obviated. Five plots were allocated to an experiment arranged to secure some information on this matter. The plots were sprayed twice each with the respective mixtures, and the results are given in the following table:—

Plot	Bordeaux Mixture.	Total Yield lbs.	Diseased 'bs.	per cent. Diseased
20	One day old,	62½	13½	21·6
21	Seven days old,	49	9½	19·4
22	One day old +sugar (·075 per cent.), . .	55½	12	21·6
23	Seven days old+	51	8½	16·6
24	Fresh +	70½	8	11·3

It will be seen that the greatest total yield, and at the same time the least percentage of diseased tubers, was produced by the plot sprayed with the fresh mixture to which sugar was added. The one-day-old mixture gave the next best total yield, whilst the seven-days-old gave the worst in this respect. The addition of sugar to the one-day-old mixture did not result in an increased yield, but a slight increase was produced in the case of the seven-day-old mixture when

* Kelhofer, W.—Ueber einige Gesichtspunkte bei der Herstellung der Bordeauxbrühe Internat. phytopath. Dienst. Jahrg. 1 Stück 3, 1908, p. 65.

sugar was added. The percentage of diseased tubers is the same in the case of the one-day-old mixtures, and in the seven-day-old mixtures the addition of sugar caused some reduction in it. The results show the advantage of using freshly prepared mixture, and do not lead to the conclusion that the disadvantages of a stale mixture are adequately compensated for by the addition of sugar at the time of preparation.

A similar experiment was tried with Burgundy mixture, although it is not claimed that the addition of sugar to this at the time of its preparation will act as a "preservative" as in the case of Bordeaux. The results obtained do not lend themselves to the drawing of any definite conclusions, except that the fresh mixture with the addition of sugar gave the greatest total yield.

It was noticed in these two series of plots that those sprayed with Bordeaux mixture remained green considerably longer than those sprayed with Burgundy, a fact which was corroborated in other plots of potatoes in the vicinity of the station during the season.

Enquiries have been addressed from time to time to the Department as to whether sea water might replace the

**Sea Water
in Spraying
Mixtures.**

fresh water used in prepared spraying mixtures. In some localities in the West, particularly in some of the outlying islands, difficulty is sometimes experienced in obtaining a proper supply of fresh water for the purpose, and it would be of considerable advantage if this could be replaced by sea water. Preliminary experiments were carried out at Clifden in 1909, and the results obtained were encouraging in so far as they showed that the use of sea water did not of itself result in any very serious damage to the plants. Further experiments were therefore organised during the past season, four localities in all being chosen—three near Clifden, and the fourth (supervised by the Department's Assistant Overseer, Mr. W. F. White) in the neighbourhood of Belmullet, Co. Mayo. Five plots were laid down in each locality, the nature of which will be seen from the accompanying table, in which the yields calculated in lbs. per square perch are also given. All the plots were sprayed twice, the mixtures being made up in accordance with the Department's Leaflet previously mentioned, with some slight modification of quantities found necessary in the cases where sea water was used.

It was found slightly more troublesome to prepare the mixtures when sea water was used, the copper sulphate dissolving more slowly than in fresh water and producing a faint white precipitate. The washing soda was also slower in dissolving in sea water, a fairly copious white precipitate being produced, and hence reducing the amount of soda available for precipitating the copper sulphate. As was, therefore, to be expected, it was found that rather more soda than usual was necessary to prepare a correct, neutral mixture.

has yet been produced. A plot at Clifton was planted with one hundred and fifty tubers attacked with *Phytophthora*. About sixty per cent. of these died in the ground, and produced no overground stalks at all. The remainder produced plants which, it is true, were less robust than others grown from healthy tubers owing to the serious diminishment of food available in the diseased tubers, but which remained perfectly healthy up to 15th July, when they became spotted with blight in the usual fashion. There was no trace of disease passing up from the underground portions through the stalks, and infection doubtless occurred from spores carried from affected plants in neighbouring plots, some of which had become attacked some three weeks or so previously. The plants were lifted on 22nd August, but as they had been sprayed three times the foliage had not become seriously blighted, and it was found, after careful examination, that not a single tuber was affected with the fungus. This tends to show that the idea that the new tubers may become infected directly by means of mycelium passing into them from the old diseased sets is not correct, a view, however, which is also advocated in connection with the theory of infection by dormant mycelium.

When potato tubers are affected with blight the greater number of them are completely killed during the winter. If the remainder be planted a very large proportion of them will also die or "miser." Of those that do produce sprouts overground by far the greater number give rise to plants which remain perfectly healthy until they become infected in the usual way by means of aerially borne spores. A few may produce feeble sprouts above ground which become diseased by means of mycelium derived from the planted tuber. On such affected sprouts spores may be developed if the conditions of moisture and warmth in the surrounding air be favourable, hence such diseased sprouts may be regarded as dangerous centres of infection for the neighbouring plants, but they can scarcely be of frequent occurrence in the fields.

"YELLOWING," OR "YELLOW BLIGHT."

The nature of this trouble was somewhat fully described in the article published in this *Journal* a year ago, and previously alluded to.

* Pethybridge—Considerations and experiments on the infection of potato plants with the blight fungus (*Phytophthora infestans*) by means of mycelium, derived direct from the planted tubers. Scientific Proceedings, Royal Dublin Society, Vol. 13, No. 2, 1911.

variety a tendency was noticed on the part of a number of the new tubers to sprout unusually early, and at the time of lifting the crop at the end of September a good many of these had already produced green shoots above ground. Each of these varieties suffered considerably from the attacks of both Black Stalk Rot and Stalk Disease, so that the comparative yields of the two plots could not well be estimated.

Result of Planting Diseased Tubers.

There is still a considerable amount of uncertainty as to how exactly the infection of the potato crop with blight takes places each recurring season. It is generally believed, and with good reason, that this is brought about by means of spores. Now, the spores produced by *Phytophthora* during the season are extremely sensitive to external influences and soon lose their power of germination, so that they cannot persist alive over the winter from one season to the next. It is conceivable, and even somewhat probable, that the fungus may produce a second form of spore with more resistant properties which would be capable of remaining dormant over the winter, and which would germinate during the following summer. Such spores have been sought for, but up to the present no definite and conclusive evidence of their existence has been brought forward. It is well known that the fungus attacks the tubers and is able to live in them over the winter in the form of spawm or mycelium. When such tubers are placed under conditions of warmth and moisture the spawm in them grows out into the surrounding moist air and produces a fresh crop of spores. The attack of the crop, therefore, in all probability takes place from such spores produced from mycelium which has passed the winter in the tubers. Spores may be produced in this way even when diseased tubers are in the soil, and if by any means such spores are able to reach the surface and get above ground, as may perhaps be the case when earthing up is in progress, or possibly when insects are emerging from below ground, a chance of their doing so and ultimately reaching the foliage would be given.

Recently the view has been advocated that the blight is propagated directly by means of mycelium or spawm, which is supposed to be in a dormant condition for a long period, and then, during June or July, when wet and warm weather conditions often prevail, to grow up into the stalks and foliage and to burst forth and produce fresh crops of spores. It would be going too far to deal with this matter in the present article, particularly seeing that it has recently been fully dealt with in a paper* read before the Royal Dublin Society in December last. A careful consideration of the known facts about *Phytophthora* shows at once that the theory of direct infection by dormant mycelium is highly improbable, and no scientific evidence in support of it

. The footnote to which the * on page 425 refers
has been inadvertently printed on page 426.

As will be seen from the table, in all cases except two, where the yields were nearly equal, the plots sprayed with mixtures made with fresh water gave a greater total yield of tubers than those where sea water was used for the purpose, and further, in all cases except one a greater yield of healthy tubers was obtained when the mixtures used were made with fresh water. In eight cases out of the ten where there were differences in the percentage yield of diseased tubers six gave results in favour of the fresh water and two in favour of the salt water mixture. On the whole, therefore, the results show distinctly that the efficiency of either Bordeaux or Burgundy mixtures is lessened, in some cases quite seriously, when sea water is used in the preparation of them instead of fresh water. The explanation of this is not far to seek, for it was observed that whereas the mixtures made with fresh water dried on the foliage after spraying in a normal and satisfactory manner, those made with sea water remained moist for a long time and dried exceedingly slowly, in all probability owing to the hygroscopic nature of some of the salts contained in the sea water. The consequence was that when rain fell, even at some considerable period after the spraying operations had been carried out, the mixtures made with sea water were washed off the foliage, and hence the plants were left more or less unprotected. In all cases where sea water was used, and especially in the control plots No. 5, where sea water alone was used, it was noticed that the foliage of the plants became wilted after spraying, but after a short period this unfavourable symptom disappeared, and no permanent injury accrued except in the case of sea water alone, where a slight amount of "burning" or browning of the tips of the young foliage was observable. The plots sprayed with sea water alone behaved with respect to the attack of the blight as if they had been not sprayed, and when the reduced yields and increased percentages of diseased tubers produced in these plots are compared with those of the sprayed plots the advantages of spraying are clearly demonstrated. Summing the matter up, therefore, it may be said that spraying with a mixture made up with sea water is better than not spraying at all, but the use of sea water for preparing a spraying mixture results in a considerable loss of efficiency in the spray as compared with that of fresh water, and should only be resorted to as a makeshift expedient when it is impossible to obtain fresh water.

Two varieties, namely, "Shamrock" and "Clifden Seedling," were planted and left unsprayed during the season. Neither of them was absolutely immune to

**Blight
Resisting
Varieties.**

the blight, the foliage being slightly spotted; nevertheless a high degree of resistance is possessed by both of them. In the case of "Shamrock," a few tubers attacked with *Phytophthora* were produced. In the case of this

COMPARISON OF SPRAYING MIXTURES MADE WITH FRESH AND SEA WATER RESPECTIVELY.

	Locality.	Cushatrough.				Cloughanard.				Lettershanna.				Belmullet.			
	Variety.	Irish Queen.		% Diseased		Up-to-Date.		% Diseased		Champion.		% Diseased		Champion.		% Diseased	
Plot.	Yield.	Healthy	Diseased	Total.	% Diseased	Healthy	Diseased	Total.	% Diseased	Healthy	Diseased	Total.	% Diseased	Healthy	Diseased	Total.	
1	Bordeaux Mixture made with Fresh Water.	129.5	7.5	137	15.4	201.5	1.5	203	0.7	272.5	1.5	274	0.5	93.75	0	93.75	
2	Bordeaux Mixture made with Sea Water.	95	3.5	98.5	3.5	199.5	6	205.5	2.9	223	2	225	0.9	68.5	0	68.5	
3	Burgundy Mixture made with Fresh Water.	90	3	93	3.2	230	8	238	3.4	261.5	0.25	261.75	0.1	98	0	98	
4	Burgundy Mixture made with Sea Water.	91	2	93	2.1	197.5	7	204.5	3.5	224.5	0.5	225	0.2	59.5	3.5	63	
5	Sea Water alone.	64	5.5	69.5	7.9	185.5	11	196.5	5.5	169	3.5	172.5	2	49	10.5	59.5	

to. It may be recalled here that no fungus or other parasite could be found as a cause of the disease, but that, on the other hand, soil conditions seemed to play the most important part in producing it. It was stated that there are two extremes of soil on which "yellowing" is common, namely, on wet, undrained, bog land, and on light, shallow soils where the underlying rock comes up to within a short distance of the surface.

One portion of the land at the Clifden station, having an area of about twenty-two square perches, was of the former character, and gave a crop of potatoes in 1908 which suffered very badly from "yellowing,"

**"Yellowing"
Cured.**

and which was scarcely worth digging owing to the very poor yield of tubers. One half of this plot was well drained in the spring of 1909, and the improvement in the crop of that year owing to this operation was very marked. In the spring of 1910 the remaining half of the plot was also drained, with the result that in the crop of potatoes grown on this land this year there was no more trouble from "yellowing." Both in 1909 and in 1910 the land was, in addition to the draining, thoroughly well cultivated (with the spade), and there seems to be no doubt that this combined process of drainage and good cultivation which has cured this land of "yellowing" would prove to be of the same value on similar land elsewhere. In 1910 the manure applied consisted of a mixture of complete artificials made up according to the Department's formula, and applied at the rate of 10 cwt. per statute acre to the whole area. This was subsequently divided into four equal parts, and to each of two of these further artificials, at the rate of 5 cwt. per statute acre, were given at the time of the second "moulding" of the plants, which took place six weeks after planting. The object of this was to ascertain whether the addition of a further quantity of manure would be of benefit on this class of land in assisting to ward off "yellowing" and in producing an increased yield. As regards "yellowing" there was no perceptible difference between the portions differently manured, for it was absent altogether, neither could any appreciable difference be noted in the growth of the stalks and foliage. The yield of marketable or large potatoes was practically the same in each case, being at the rate of just over four a half tons to the statute acre, and there was a further quantity of "smalls", at the rate of about one and a half tons per acre, as well as diseased ones, at the rate of just over half a ton per acre. The diseased tubers were chiefly attacked by *Phytophthora*, Black Stalk Rot, and *Spongospora*. This yield, though at first sight apparently small, must be regarded as, on the whole, a very satisfactory one, especially when it is remembered that the land was poor to begin with, that it had carried a crop of potatoes for three seasons in succession, and that it received

artificial alone and no seaweed or farmyard manure. The measures taken, therefore, in this instance not only cured "yellowing," but resulted in the production of a satisfactory crop of tubers.

An experiment was carried out on a small scale, which served to show that the supposition that "yellowing" is due, at least in some cases, to excessive soil moisture is substantially correct. A large tin box was sunk so that its upper edge was at the same level as the surface of the soil. It was filled with wet boggy soil, and two tubers were planted in it. Even during dry weather this soil, of course, remained wet owing to the absence of drainage, and the two plants produced grew into small specimens which showed the typical signs of yellowing just as they appear in wet, undrained bog soils, and which died off comparatively early, giving little or no produce.

With regard to the other form of yellowing which occurs in shallow soils but few opportunities offered themselves during the season for its investigation. One particular case, however, may be mentioned. The specimens in question were fairly well grown, and were sent in for examination by the Department's Assistant Agricultural Overseer (Mr. M. Daly) from Oughterard, Co. Galway. The stalks and foliage, although showing no other signs of disease of any kind, were of a bright canary yellow colour, there being practically no green about them. Investigation with the microscope revealed no signs at all of fungi or other parasites. Enquiries made as to the nature of the land on which they were grown showed that the field in question produced normal plants except on a small portion in its centre. Whenever potatoes were grown in this field the owner found that they turned yellow on this particular area. It was ascertained that whereas the soil over the greater part of the field was deep, that over this area was shallow, there being a depth of but fourteen or sixteen inches before the solid rock was met with. Evidently the absence of soil into which the roots could penetrate in search of more food materials was at the bottom of the trouble.

In order to ascertain whether "yellowing" is, as has sometimes been stated, "a case of pure starvation," plants have been grown during the two past seasons under conditions precluding the supply to them of any considerable amount of mineral salts. This has been effected by planting tubers both in poor, reclaimed, bog soil with fairly good drainage and with no manure of any kind, and also in boxes of clean silver sand. The result was the production of dwarf, but sturdy plants, the colour of whose foliage was not yellow, but, if anything, of a distinctly deeper green than that of other plants grown under normal conditions. In the sand the plants when dying off did

show some slight yellowing of the leaflets, but nothing comparable to some of the cases of "yellowing" which may often be observed naturally in the field. It would, therefore, seem that starvation conditions, at least when present from start to finish of the plant's life, do not produce "yellowing," although it is quite possible that the somewhat sudden advent of such conditions following on a period of normal nutrition may result in its development, but the question requires further investigation.

THE "STALK" OR "SCLEROTIUM" DISEASE.

(*Sclerotinia sclerotiorum* Mass.)

In connection with this disease it was pointed out last year that, contrary to what had formerly been supposed, yellowing of the foliage is not one of its principal or characteristic symptoms, and that therefore the fungus of the stalk-disease could not be made responsible for "yellowing" or "yellow blight." The observations upon which this conclusion was based were renewed during the past season, with the result that it was abundantly confirmed, and the two diseases must therefore be looked upon as quite distinct, although plants may, of course, at times be found which are simultaneously suffering from both "yellowing" and stalk-disease.

Up to the present one of the most serious gaps in our knowledge of the behaviour of the fungus responsible for the disease has been the lack of information as to the way in which the plants become attacked. As will be remembered, the disease is characterized by the production of small, black, seed-like bodies (sclerotia) principally on and in the dying stalks. These sclerotia represent a resting stage of the spawn or mycelium of the fungus, and in this form it is enabled to pass the winter. In the spring and summer these sclerotia, which are then to be found in and on the soil, germinate and produce stalked "spore-cups" (apothecia), from which little puffs or clouds of spores can be seen to proceed. Nothing could be simpler than to suppose that the potato plants become infected directly from these air-borne spores. Arguments have, however, been brought forward which seemed to show the impossibility, or at least the improbability, of this mode of infection. Thus de Bary found that when the spores germinated in water the germ tubes were quite unable to penetrate the living healthy tissue of the plant. If, however, germination took place in a nutritive solution, instead of in water only, the germ tubes were found to be capable of producing infection. So impressed was de Bary with this difference in behaviour of the spores according as to whether they germinated in pure water or in a food solution that he went so far as to state* that the fungus always

* de Bary, *Comparative Morphology and Biology of Fungi*, &c. English Edition, 1887, p. 380.

requires to pass through a previous stage of existence as a saprophyte in order to be capable of parasitism. The expression "previous stage of existence" appears to have had a somewhat exaggerated importance attached to it, at least from the practical point of view, and has led to the idea being promulgated that in one stage of its life history the fungus lives saprophytically, *i.e.*, on decaying manure or organic matter in the soil, and hence it has generally been maintained that the potato plant becomes attacked at soil level by the invasion of saprophytically nourished mycelium from the soil. This view of the mode of infection by this fungus is, of course, supported by the experiments carried out by de Bary on potted plants of *Zinnia*.* Ten of such plants were contained in a single pot of soil, and, placed in contact with the base of the stem of one of them, was a piece of carrot on which the fungus was living. Ultimately nine out of the ten plants succumbed, the attack in each case taking place at the soil level. This result can scarcely be regarded as surprising, but it is not necessary to conclude from it that in the field the attack must always come from the soil.

Both during last season and the season before cultures were made of the fungus which proved that it could grow saprophytically, and indeed in suitable nutrient solutions, such as sterilised fruit juices, etc., the growth is luxurious and sclerotia are abundantly produced. In the watery extract of soils both of a boggy and a loamy nature the spores also germinate and produce both mycelium and sclerotia. The growth, however, is so extremely poor in such media and the sclerotia formed so few and so minute that it is scarcely probable that the fungus could maintain a vigorous saprophytic existence in ordinary soils for any lengthened period. Up to the present, at any rate, no one has reported the finding this fungus living naturally in the soil as a saprophyte.

It is true that in the case of the potato the point of attack is often at or near soil level, and the photograph reproduced in Fig. 1 shows a stalk attacked in this position and falling over, or becoming "haughed," as it is usually expressed. But as was found from last year's observations and confirmed by those of the past season, the points of attack are very frequently found a considerable distance above soil level, so that there can be no question of infection from the soil at such places.

It might be supposed, when two or more attacks occur on the same stalk and one of them is near soil level, as is not infrequently the case, that the upper infected spots might have been caused by the mycelium of the fungus having passed upwards through the internal tissues of the stalks. Microscopic investigation, however, showed

* de Bary, Ueber einige Sclerotinien und Sclerotienkrankheiten. *Botan. Zeitung* XLIV., 1886, p. 378 et seq.

INVESTIGATIONS ON POTATO DISEASES.



Fig. 1. Stalk Disease.—A potato plant with a "haughed" stalk. The white base of the stalk near the soil is the point of attack in this case.

INVESTIGATIONS ON POTATO DISEASES.



Fig. 2. Stalk Disease.—A stalk attacked in two places, high up and away from the soil, at one of which fracture has occurred.

in all cases examined that the tissues between such separated infected areas are, in the early stages at least, perfectly healthy and quite free from mycelium. Neither could the position of these points of attack be explained, except possibly in a very few cases, by supposing that the stalks had already come in contact with diseased areas on other stalks, and thus have become infected by the transference of mycelium.

The mycelium of the fungus produces no secondary spores, the only ones known being those derived from the "spore-cups"; hence the possibility of infection by such secondary spores is excluded. In cultures of the fungus made on artificial media structures were observed somewhat resembling spores, but these bodies, whatever their true nature may be, would not germinate either in water or the best of nutritive solutions, and could not therefore cause infection; moreover, they have been observed up to the present only in such artificial cultures. When such points of attack occur high up on the stalks the result is often the production of a definite fracture of the stem, and not a mere bending over, as is usually the case when the point of attack is low down. Figure 2 illustrates this condition of affairs. Of course many of the attacked stalks remain more or less upright and do not fall over at all, and the photograph taken early in September and reproduced in Fig. 3 gives a good idea of the state of things resulting from the disease, the two plots in the foreground, each marked with a wooden stake, having suffered from a severe attack.

The observations made on the localisation of the areas of attack on the potato stalks point very strongly to the conclusion that, in probably the majority of cases, infection does not take place from the soil, and suggest the great probability that it occurs directly by means of aerially carried spores. It may be remarked in passing that this circumstance, if true, would not in any way call in question the accuracy of de Bary's observations on the behaviour of the spores, for it is quite possible that the moisture on the surface of the plant contains sufficient nutriment to enable the germ tubes to enter it, owing partly, perhaps, to exudations from the plant itself and to dust and other débris which may have accumulated on it. Indeed, de Bary himself showed that the amount of nutriment necessary for the purpose is exceedingly small. Again, where wounds occur, as, for example, if the plants become bruised by mutual contact brought about by wind, or, as is the case when the lower, older and shaded leaves fall off, there is always the possibility of at least small quantities of nutriment for the fungus spores and their germ tubes being present.

Three experiments have now been carried out with a view to ascertaining whether the potato can become infected with this

Proof of Aerial Infection.

disease altogether apart from any intermediary action of the soil, and in all three cases the question has been answered in an affirmative sense. In the first experiment a cut stalk was placed with its lower end in a flask of water, and was covered with a bell jar, having an opening at the top closed by a cork. Ripe "spore-cups" were fastened by means of a pin to the lower surface of the cork within the bell jar, so that the spores could fall on the foliage. The result was that the disease appeared, and typical sclerotia were produced. This experiment was carried out as a preliminary one in 1909, and during the past season similar ones have been twice repeated, with this principal difference, namely, that plants growing in pots were used, and that in each case a control plant was simultaneously kept under identical conditions, with the exception that no spore-cups were introduced into the bell jars covering the plants. A disc of thick cardboard or paper was laid on the rim of the pot previous to starting each experiment, the level of the soil in the pot being about one inch below this. Through a hole in the centre of this the stalk of the plant passed, and the slit in the cardboard, made for the purpose of introducing the stalk, as well as the space between the edges of the hole and the surface of the stalk, was filled up with plasticine wax. Beneath the bell jar a beaker of water was allowed to stand in order to produce the necessary amount of moisture in the air, and in addition to this the foliage was once or twice sprayed with distilled water by means of an atomiser.

In both cases infection occurred, in one on a stalk, where two sclerotia were formed externally, and in the other on one of the lower leaves, which became yellow during the experiment, and which ultimately dropped off with mycelium on it, from which three sclerotia ultimately developed. The control plants in both cases remained unattacked. The time taken for a degree of infection visible to the naked eye to occur varied between three and four weeks from the time that the "spore-cups" were introduced into the bell jars.

From these observations and experiments it must therefore be concluded that the potato plant can become infected with this disease directly by means of air-borne spores, and that the intermediary action of the soil is not necessary. The point is one of practical importance, for, if infection occurred only from the soil at the base of the plant, remedial measures would need to be applied to the plants at such places only, whereas if the infection is more or less general over the plant the whole of it would require to be suitably protected. Observations of plants in the plots strongly suggest that in the main an entry into the plant is gained in two or three ways. The first of these is through the older, shaded, yellowing leaves, which ultimately fall off. The fungus is not infrequently found on them and makes its way down the leaf-stalk, and thus its mycelium reaches the stem of the plant and enters it. It seems quite possible

that the germinating spores might be able to secure an entry into such dying leaves whereas they would still be unable to directly infect perfectly healthy ones. This state of affairs has been proved to hold good for certain forms of fungi, such as *Botrytis*. Such affected leaves frequently fall off before the fungus reaches the stem, and are to be seen with sclerotia on them resting on the soil, but in many cases they remain on the plant long enough for infection of the stem to occur. The second point of entry which suggests itself consists of the series of wounds left on the stalks by the falling leaves. In any case it is a fact that by far the greater number of cases of infection occur at a node, *i.e.*, where the leaf joins the stem. The axil of the leaf, too, forms a convenient place for the accumulation of drops of water, in which it is likely that the spores would germinate easily. Further investigations, however, must be made to settle these points, but the essential fact which has been brought out by those of the past season remains, *viz.*, that the attack of the potato plant with this disease takes place chiefly from aerially-borne spores and not, as has been hitherto maintained, from the soil.

The accompanying table provides a summary of the experimental plots which were laid down with a view to discovering some method of checking the disease. It will be noted that the remedies tried take into consideration the idea that the plants may become attacked not only at soil level, but also higher up, although, at the time of planting, the experiments on the possibility of aerial infection by spores had not been completed.

**Attempted
Remedial
Measures.**

Each plot was one square perch in extent, and all the plots received artificial manure only at the rate of ten cwt. per statute acre. In addition to the treatment mentioned in the table all the plots were sprayed three times during the season with Burgundy mixture to ward off *Phytophthora*. The second of each pair of plots, *i.e.*, plots b, d, f, h, etc., was supplied with an extra quantity of sclerotia, these having been collected during the previous autumn and kept out of doors mixed with a little soil during the winter. That all the plots already contained a considerable number of sclerotia was known from the fact that potatoes were grown on the same plots during the previous season, and were then attacked rather badly by the stalk-disease.

Three times during the season the number of plants attacked in each plot was carefully counted, and the results are given as percentages in the table. The attack commenced somewhat later than it sometimes does, and it is noteworthy that the number of plants visibly attacked went on increasing even for a considerable period after the "spore-cups" developed from the sclerotia had disappeared. The plots which contained the increased quantities of scler-

rotia did not as a whole show an increased number of attacked plants.

No. of Plot	Treatment.	% of plants attacked on			Yield in lbs. per square perch.			
		Aug. 8	Aug. 22	Sept. 10	Large	Small	Discased.	Total.
a. b.	Quicklime, 4 tons per acre worked into soil before planting.	2.5 24	10 35	30 43	76 68	33 22	25 11	134 101
c. d.	Sets planted in handful of lime and lime kept at base of stalk at soil level through season.	13 23	30 40	48 64	60 76	17 22	6 4.5	83 102.5
e. f.	Soil dressed with Burgundy Mixture, 1 gallon per sq. yard, three days before planting.	18 16	20 28	58 50	65 52	16 20	0 0	81 72
g. h.	Surface of soil sprayed with Burgundy Mixture and repeated three times during season.	0 20	14 40	45 53	76.5 67.5	23 19.5	0 0	99.5 87
i. j.	Plants sprayed with Burgundy Mixture thirteen times during season.	10 0	28 12	50 43	63 72	21 26	2.5 7	86.5 105
k. l.	Bases of stalks only, at soil level, dressed with Burgundy Mixture fourteen times during season.	12 4	28 0	43 48	70 66	20 21	5 12.5	95 99.5
m. n.	Only one row of plants, 3 ft. apart (18) as against 3 rows (132), in other plots	0 0	0 6	0 11	30 21	3 4	12.5 9	45.5 34
o. p.	Stalks limewashed three times during the season.	0 0	23 23	48 55	52 48	25 19	9 4.5	86 71.5
q. r.	Stalks dusted with lime and sulphur five times during season	18 18	30 43	50 48	54.5 54	20 22	8 9.5	82.5 85.5
s t	{ No treatment. }	27	45	48	57	22	5.5	84.5
		16	20	43	70	22	3.5	95.5
u. v.	Older leaves removed by hand as they yellowed and died.	23 12	45 23	65 42	77 62	31 27	4 6	112 95
w. x.	Plants sprayed with liver of sulphur solution four times during season.	4 6	14 15	34 32	65 63	21 27	9 10	95 100

The most striking results are perhaps those of plots m and n, and they seem to show that there is far less chance of infection when the plants are well isolated than when they are crowded together mutually shading each other and having their stalks surrounded with more or less moist, stagnant air. Plot a, which was an outside one and was well exposed to sun and wind, also shows some reduction in the number of attacked plants as compared with the average of other plots. Plot x was not an exposed one, as in an adjoining plot large cabbages were grown.

Taking the results of the applications of the various fungicides to the plants into consideration it must be confessed that they are disappointing, spraying with liver of sulphur solution being the only treatment which seems to have had any effect in reducing the number of affected plants, and this but a slight one. Plots similar to c, d, e and f, gave the best results in 1909 in this respect, but during 1910 these plots were, if anything, rather worse than the majority of the

INVESTIGATIONS ON POTATO DISEASES.

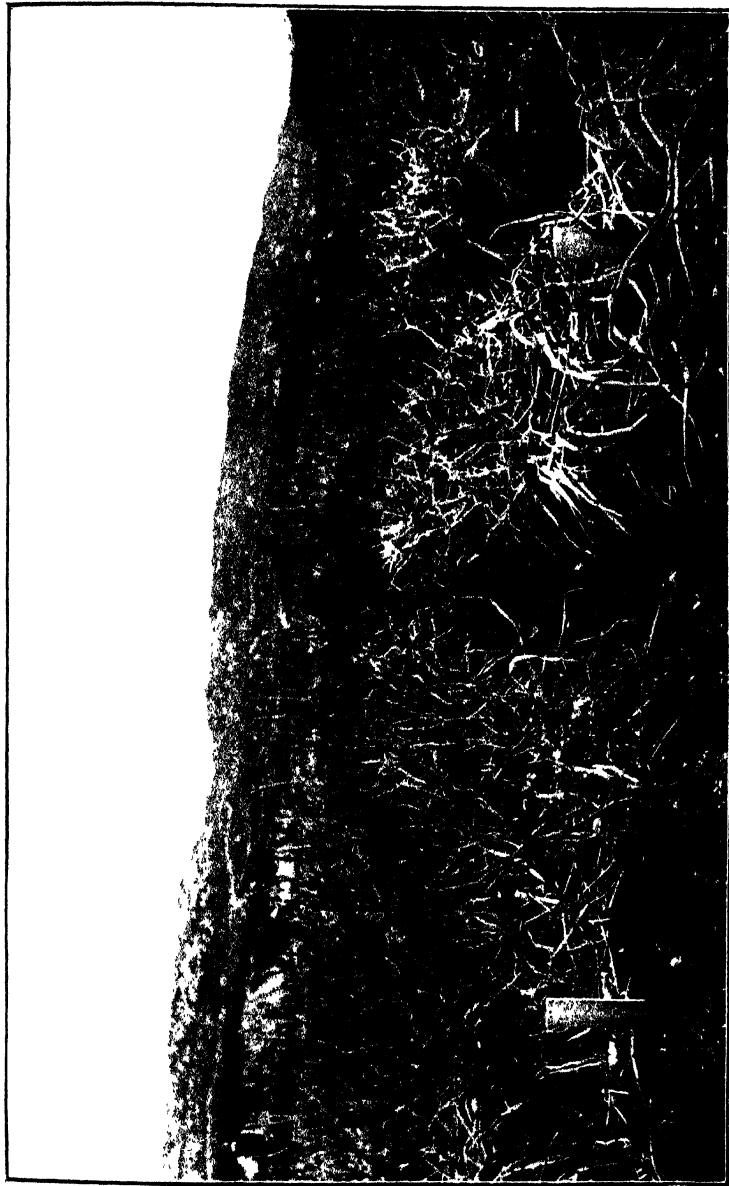


Fig. 3. Results of attack by Stalk Disease (Sclerotinia). The two plots with stakes in the foreground were particularly seriously attacked.

INVESTIGATIONS ON POTATO DISEASES.

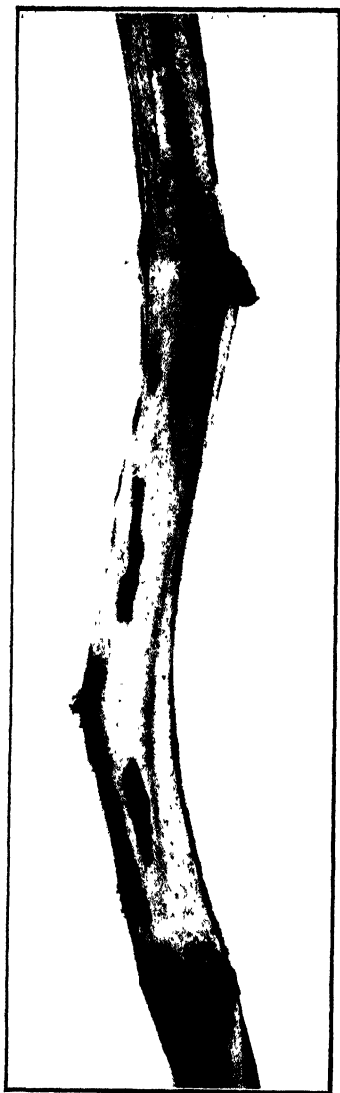


Fig. 4.

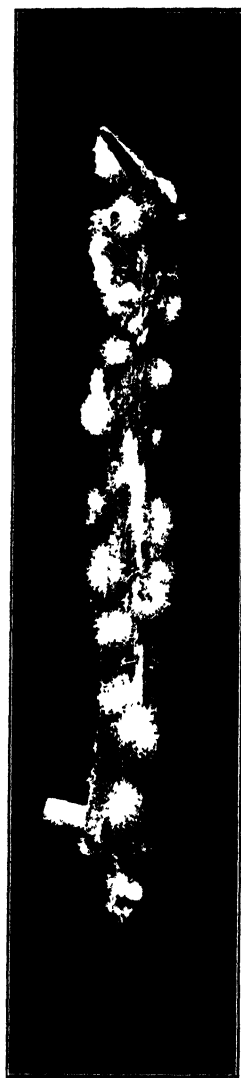


Fig. 5.

Fig. 4. A potato stalk with the black, adhering sclerotia of *Botrytis*.

Fig. 5. A similarly affected stalk shewing the tufts of spore-bearing mycelium which have developed from each sclerotium.

others. With regard to the diseased tubers raised these were principally attacked with *Spongospora* and, to a less extent, with *Phytophthora*. It will be noted that in plots e, f, and h, where the soil received considerable amounts of Burgundy mixture, there were no diseased tubers, but the average total yield of the two plots e and f was considerably lower than that of the control plots s and t, whereas that of plots g and h was higher.

Treatment of the soil with Burgundy mixture, however, seemed to have not the slightest effect on the germination of and production of "spore-cups" from the sclerotia, for such "spore-cups" were observed growing up unchecked through areas thickly coated with the mixture. It was pointed out last year that the attack of this fungus is considerably favoured by the shade and moist conditions produced when potato plants are grown close together, and the results this year confirm this conclusion. It would, however, not be practicable to grow potatoes at such wide distances apart on a large scale, but less close planting in the ridges than one often sees in the West of Ireland seems desirable.

BOTRYTIS.

The stalk-disease caused by *Sclerotinia* is often accompanied by another but less serious trouble due to *Botrytis*. Attention was called to this matter last year, and further observations have been carried on during the past season. It is quite a common thing to find, not merely in the West of Ireland, but almost anywhere where potatoes are grown, that the more or less blanched stalks at the close

Characters of Attack.

of the season are characterised by the presence of black areas slightly raised, as a rule, from the surface of the stalk, and found both on the inside of it as well as on the outside. These black patches are flattened masses of compacted fungus mycelium, including usually within them some of the fibres and other tissues from the decaying stalk, and they are the sclerotia of the fungus *Botrytis*. Fig. 4 will serve to give an idea of what a potato stalk with its adherent *Botrytis* sclerotia is like. These sclerotia differ in several respects from those of *Sclerotinia sclerotiorum*. They adhere to the stalks, with but few exceptions, and when they germinate they produce not "spore-cups," but tufts of mycelial branches which bear myriads of spores. Fig. 5 shows the sclerotia of *Botrytis* producing such spore-bearing tufts. The internal structure of these sclerotia as seen with the microscope differs also from that of the sclerotia of *Sclerotinia*. It was at one time supposed that *Botrytis* was merely a stage in the life history of *Sclerotinia*, but the facts just stated show that this view is not correct. Both *Sclerotinia* and *Botrytis* were grown during the past two seasons in artificial media in pure cultures, and the one has never shown any signs of being a stage of the other. *Sclerotinia* mycelium has never given rise to *Botrytis*

nor has *Botrytis* produced the sclerotia characteristic of *Sclerotinia*. The sclerotia produced by *Botrytis* in artificial media are flattened, somewhat thin structures resembling those formed by it on the potato stalks, but since they frequently become convex upwards they show a false similarity to the solid oval or rounded sclerotia of *Sclerotinia*.

The damage done by *Botrytis* to the potato is not so great as that caused by *Sclerotinia*, nevertheless in some seasons it may not be inconsiderable. The spores of this fungus infect the yellowing leaves, and the mycelium passes thence to the stems. Younger leaves may also apparently become attacked, and the result is that the fungus reaches the node of the potato stalk. Now the rigidity of the internodes of a potato stalk is due, at any rate in the upper ones, chiefly to mechanical tissues suitably disposed within the stem. At the node, however, this mechanical tissue is practically absent, rigidity is obtained by the turgescence of the cells of softer tissues, and the node itself is therefore larger and more sappy than the adjoining internodes. It appears to be just this sappy node which *Botrytis* at first chiefly attacks, and the consequence is that the top of the stalk falls over. The fracture is rather characteristic, and is shown in Fig. 6, but it has been already mentioned that when an attack by *Sclerotinia* occurs fairly high up in the stalk a somewhat similar fracture is frequently produced. Under suitable conditions, however, in the latter case typical *Sclerotinia* sclerotia will develop, whereas in the former the presence of *Botrytis* is recognised by the development of the characteristic spores. Attacks by *Botrytis* are usually greyish in colour, those by *Sclerotinia* more frequently of a white colour.

Remedies Tried.

Eight plots were devoted to the *Botrytis* disease, and the following table shows both their scope and the results obtained :—

No. of Plot.	Treatment.	% of plants attacked on.			Yield in lbs. per square perch.			
		Aug. 8	Aug. 22	Sept. 10	Large	Small	Dis-eased.	Total
I.	No treatment, no sclerotia, . . .	9	18	90	61	31	6.5	98.5
II.	No treatment,	18	30	90	63	21	9	93
III.	Old yellowing leaves removed by hand as they appeared.	57	—	90	65	21	10	96
IV.	Sprayed with liver of sulphur solution five times during season.	18	29	90	75	29	14	118
V.	Sprayed with weak lime-wash four times during season.	—	30	90	63	25	10	98
VI.	Only two rows of plants in plot instead of three in others.	37	42	100	75	19	4.5	98.5
VII.	No treatment, weeds allowed to grow unchecked.	45	45	100	62	28	16	106
VIII.	Stalks dusted with mixture of lime and sulphur several times during season.	21	30	100	62	21	6	89

In order to secure that adequate infective material should be present on these plots each of them, except No. 1, had laid on the surface a considerable quantity of old stalks thickly covered with *Botrytis sclerotia*, after the second "moulding" took place. These affected stalks were brought from Co. Dublin, where the stalk-disease (*Sclerotinia*) is as yet unknown, so that the sclerotia of this latter fungus were not present in this material. The *Botrytis sclerotia* soon gave rise to copious quantities of spores, and the number of affected plants remained less in Plot I. (which received none of this material) for a considerable period longer than was the case in other plots. Towards the close of the season all the plots became infected to a large degree, and the percentages given in column 5 of the table (September 10th) are only approximate. It will be observed that none of the remedial measures tried produced any very satisfactory result in lessening the number of plants attacked. It is interesting to note that plot VI., where only two-thirds of the usual number of plants were grown, gave as high a yield of marketable tubers as any other, but it is rather doubtful whether the higher total yield of plot IV. was due to the spraying with liver of sulphur solution. In Plot VII. owing to the fact that the land had not been previously broken up, the weeds were chiefly confined to the edges of the ridge, and did not grow up between the plants themselves.

It cannot be said therefore that any completely satisfactory remedial measures have as yet been discovered with which to combat these two diseases. Burning the stalks at the end of the season would, however, at any rate, lessen somewhat the number of sclerotia. The idea occurred that possibly poultry might devour the sclerotia of the Stalk Disease, but it was found that a hen refused to eat them, even after being starved for a couple of days. Too close planting should be avoided, plots should be well weeded, and anything done that can be done to secure as dry conditions as possible amongst the stalks.

BLACK STALK ROT.

(*Bacillus melanogenes*.)

This disease is of a bacterial nature, and a full description of its characters was published in this *Journal* last year.* It is not confined to Ireland, for similar diseases have been described for Germany, France, Holland, Canada, and the United States of America. In all cases bacteria have been proved to be the cause of the trouble, but the organisms responsible for it, although probably closely allied, do not appear to be identical in each country.

* Vol. X., No. 2.

A very considerable amount of work was done at Clifden in connection with this disease during the past season.

**Bacterial
Origin of
Disease.**

The particular organism which causes the disease was isolated in pure culture and found to be allied with those previously described for other countries, but not identical with any of them. Infection experiments with living plants were carried out, which showed that the organism isolated was really the cause of the disease, for the characters of it were reproduced in artificially inoculated plants. One such plant is illustrated in Fig. 7. The stalk on the left was inoculated with a pure culture of the organism, while that on the right was left uninoculated. The signs of disease are clearly evident in the inoculated stalk and absent from the other. The morphological and cultural characters of the organism were fully studied, and it was proved that it is capable not only of causing rot in potatoes, but also in turnips, swedes, carrots, and parsnips: it does not, however, affect mangels. Examples of its action when inoculated into healthy tubers are shown in Fig. 8. A paper containing a full account of the disease and of the organism causing it was read before the Royal Irish Academy in December last, and has just been published.* It is impossible to enter into the various details of this investigation in the present article, and those who desire fuller information should consult the paper referred to, but one or two matters of practical importance may be discussed here.

**Spread by
Affected
"Seed."**

With regard to the mode of infection of the plants it is probable that this may occur here, as in other countries, directly from the soil. It has not been found possible to bring forward experimental proof of this up to the present, as efforts to obtain the particular organism from the soil have so far met with no success. This result is in one way a reassuring one, as it tends to show that our soil is probably not as yet much contaminated with this disease-producing organism. A small plot at Clifden has, however, been strongly dosed with the remains of diseased plants and tubers, and probably now contains the organism in quantity. It is proposed to plant this plot with healthy tubers next season, and doubtless it will be found that infection can occur from such contaminated soil.

With regard to the occurrence of the disease and to its spread, the evidence clearly shows that this is mainly due to the unsuspected planting of already infected "seed" potatoes. An experiment, carried out during the past season, was as follows:—A plot half a square perch in extent was planted with tubers of the variety "British Premier." These particular tubers were derived from a crop,

* Pethybridge and Murphy.—A Bacterial Disease of the Potato Plant in Ireland and the Organism causing it. Proceedings Roy. Irish Acad., Vol. 29, Sect. B., No. 1.

INVESTIGATIONS ON POTATO DISEASES.

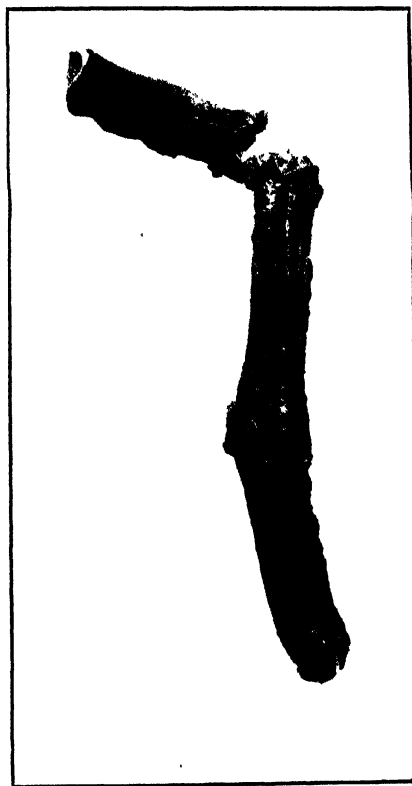


Fig. 6. Portion of a potato stalk showing the characteristic mode of fracture at a node due to the attack of Botrytis.

INVESTIGATIONS ON POTATO DISEASES.



Fig. 7. Black Stalk Rot. The left hand stalk was inoculated with *B. melanogenes* and is beginning to wither. The right hand non-inoculated stalk remains healthy.

grown in 1909, which suffered severely from Black Stalk Rot. A considerable portion of the tubers from this crop were rotten, but the apparently sound ones were boxed, and they kept well over the winter. At planting time they showed no external signs of disease, and anyone unacquainted with their origin would have had no scruple in using them for "seed." The plot in which they were planted at Clifden received artificials alone, so that infection by means of contaminated dung was excluded. Other "British Premier" seed of known healthy origin was grown on adjoining plots and produced perfectly healthy plants, moreover a bacteriological analysis of the soil of the plot was made, and the Black Stalk Rot organism could not be discovered in it, so that infection could not have arisen from the soil. The result of using the apparently healthy tubers derived from a previously diseased crop as "seed" was that, during the season, no less than ninety-four per cent. of the plants derived from them succumbed to Black Stalk Rot. One of the tubers borne by a plant from this plot is illustrated in Figs. 9 and 10. This indicates sufficiently clearly the danger of using such tubers for "seed" purposes.

**Tubers
Infected
by Contact
in Pits.**

A further point of practical importance may be noted, which is that a sound, unwounded tuber may become infected with the disease by mere contact with material in which the organism is growing, the bacillus in question having been proved by experiment to be capable of passing through the skin of a healthy tuber, even in the absence of wounds, through the lenticels or breathing pores. This fact explains why it is that if healthy and diseased tubers are present together in a pit or clump the healthy ones can become infected, and, if suitable conditions prevail, destroyed. Particularly where this disease is present, therefore, great care should be taken to exclude all diseased tubers from the pits. When a tuber becomes infected the organism does not always proceed to destroy it directly. If cool, dry conditions prevail the rot will make but little headway and the organism will lie dormant, and there is the possibility that the tuber may protect itself against the further destruction of its tissues by the formation of a protective layer of cork cutting them off from the diseased portion. Greater care should, therefore, be taken than is not infrequently the case when pits are being made, that these conditions—dryness and low temperature—should be established within them. That success attends the expenditure of extra care in pitting potatoes is shown by the fact that those pitted at the Clifden station last autumn after careful exclusion of diseased tubers and in a properly protected and ventilated pit, were found in splendid condition and with very few rotten ones when the pit was opened and carefully examined in the middle of January this year.

Another interesting question with regard to this disease is as to whether the organism producing it is also capable of producing bacterial rot in turnips such as is of somewhat frequent occurrence in Ireland. The various rots in turnips (for there is probably more than one of them) have not yet been thoroughly studied here, and much more work will have to be done in this direction before a satisfactory answer to the question can be formulated. Preliminary investigations were carried out on a brownish rot of swedes and on a white rot of turnips, and in each case the causative organism was isolated in pure culture and used for inoculation experiments. The one responsible for the brown rot in swede was found incapable of affecting potato tubers, but the one isolated from the white rot of the turnip caused them to rot. The latter organism was therefore studied rather more in detail, but it was found not to be identical with *Bacillus melanogenes*, the cause of the Black Stalk Rot. Hence, for the present, it must be concluded that the rot of turnips and Black Stalk Rot are different diseases caused by distinct organisms, although further investigations may possibly show that a form of turnip rot, produced by *B. melanogenes*, may occur naturally in the fields, particularly since it has been proved that this organism can be caused to rot turnips with ease when artificially inoculated into them.

With regard to practical methods of preventing the disease those urged in the former article may be repeated. They are, to remove and burn as far as practicable all plants seen to be affected with the disease in the crop so as to prevent the soil from becoming contaminated with the organism, and also to prevent the formation of tubers which are almost certain to become diseased, and which might therefore act as centres of infection in a pit or carry the disease to a fresh area if used for "seed" purposes the following season. In addition to this special care should be exercised to see that no diseased tubers get into the pits, and the pits themselves should be carefully constructed so as to ensure dry and cool conditions within them.

Whether there is any chance of devising a practical method of remedial treatment for "seed" tubers which are suspected of being diseased remains to be seen. External applications of disinfectants would, of course, be of little avail for a trouble which is internal: it is, however, possible that by the application of a certain degree of heat the organism in the tissues might be killed without injury to the tuber, and experiments on these lines are already in progress. Even if this should be possible, however, on a small scale in the laboratory it may be found that in practice the successful "pasteurising" of potatoes in bulk will be a more difficult matter.

INVESTIGATIONS ON POTATO DISEASES.

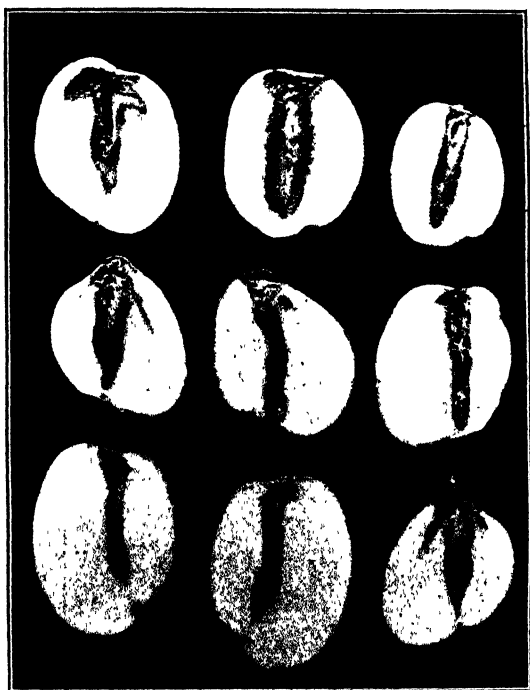


Fig. 8. Black Stalk Rot. Interiors of tubers inoculated at their heel ends by stabbing with a pure culture of *B. melanogenes*, showing the development of the characteristic rot in the tubers.

INVESTIGATIONS ON POTATO DISEASES.

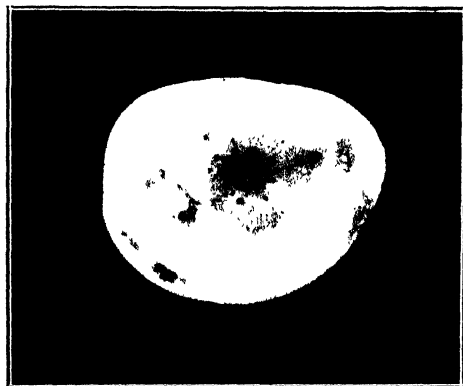


Fig. 9. Black Stalk Rot. A tuber borne on a naturally diseased plant showing the point of entry of the disease from the parent plant at the heel.



Fig. 10. Black Stalk Rot. The above tuber cut open showing the progress of the rot in its interior.

“CORKY,” “POWDERY,” OR SPONGOSPORA SCAB.

Spongospora subterranea Johns.

The principal objects aimed at with regard to the study of this disease during the past season were (1) to discover if possible any varieties of potato which might be immune to the disease, (2) to find out whether the spore-balls are killed by passage through the alimentary canal of pigs, (3) to ascertain the best method of disinfection of affected tubers so that when planted in clean land free from the organism the resulting crop should be a clean one, (4) to see how far it might be possible to destroy the organism present in land contaminated with it by the use of disinfectants, (5) to ascertain whether the organism attacks plants other than the potato.

Thirty-seven plots were laid down at the Clifden station on reclaimed bog land, each being one-half of a square perch in area. Each received a dressing of complete artificials at the rate of 10 cwt. per acre, and each was sprayed three times during the season against *Phytophthora*. In addition to these plots fifteen duplicate ones were carried out at the Agricultural Station, Clonakilty, with the co-operation of Mr. Duncan, and two further plots at Belmullet by Mr. W. F. White. At Belmullet the plots were on moory soil, while at Clonakilty they were on a loam which was analysed at the Irish Geological Survey Office and found to contain 0.24 of 1 per cent. of carbonate of lime, a quantity which is stated to be about one-third below the normal for a soil of this type.

The variety of potato used in the plots at Clifden was principally the “Champion,” but “Beauty of Bute” was also used in portions of some of the plots. At Clonakilty and Belmullet the varieties used were “Langworthy” and “Shamrock” respectively.

**No Immune
Varieties.**

The varieties tested with respect to possible immunity to this form of scab were “Irish Queen,” “Scottish Queen,” “British Queen,” “Black Skerry,” “Flourball,” “Red Cup,” “Brian Boru,” “Shamrock,” “Champion,” and “Beauty of Bute.” The land in which these varieties were grown carried potatoes during the previous season, the tubers of which were badly affected with this scab. Not one of the ten varieties mentioned was found to be immune, and the yield by weight of diseased tubers varied from 3.3 per cent. up to 51.1 per cent. A comparison of the percentages of diseased tubers produced by each variety cannot, however, be used for making any relative estimate of the different degrees of resistance (if any) of the different varieties, for it can scarcely be safely assumed that the organism was distributed at the outset in an absolutely uniform manner over the whole of the ten plots.

With regard to the dung obtained from a pig fed (under the superintendence of Mr. Drew at the Albert Agricultural College, Glasnevin) upon badly affected potatoes it was found that when clean

**Danger from
Contaminated
Dung.**

"seed" was planted in clean land in contact with manure from this source 26.8 per cent. of the weight of the resulting crop was affected, a considerable proportion of the "canker" form of the disease being present. A control plot of clean "seed" in clean land adjoining this gave 11 per cent. of diseased tubers, chiefly of the spot form, a result which is probably due to the fact that this plot (as well as the pig-dung one) was in close proximity to affected land, and some contamination of the soil was almost unavoidable. That the "seed" used was not responsible for it is shown by the fact that the remainder of the same lot of "seed" planted on fresh land well removed from the other plots produced an absolutely clean crop. The result is, perhaps, not quite so decisive as could be desired, but it seems to show that the spore-balls of this organism pass unharmed through the digestive tract of a pig, and that the manure obtained from pigs fed on diseased potatoes may be a source of infection to a potato crop treated with it.

As was pointed out last year, *Spongospora scab* presents two forms of attack, in the one case that of small spots on the surface of the tubers, and in the other the form of a "canker" or eating away of the tuber. This latter is, of course, the more serious one, but there are all degrees of transition between it and the spot form. It was found during the past season that the crop resulting from the planting of the "canker" form of disease in clean land gave 67.1 per cent. of affected tubers, while the spot form produced only 54.1 per cent. It was also proved that clean "seed" may become contaminated before planting by contact with diseased "seed," for such tubers planted in clean land produced 17.1 per cent. by weight of affected tubers.

With regard to the action of disinfectants both on affected tubers and on affected land that of lime is particularly important, seeing that it has been recommended in some quarters as a cure for the disease. The results of the previous season showed, however, that lime rather favours the disease than act as a cure for it. This view is fully confirmed by the results of the past season, as the following table will show:—

Locality.	Nature of affected Soil and "Seed."	Percentage yield of diseased tubers	
		No lime	Lime
Clifden, L.	Reclaimed bog, clean "seed,"	39	52.3
Belmullet, .	Moory soil, slightly affected "seed,"	15.5	30.9
Clonakilty, .	Loam slightly calcareous, clean "seed,"	8.8	71.1

It will be seen that wherever lime was added to affected soil the disease was seriously intensified. The amount of lime added was, at Clifden and Clonakilty, at the rate of four tons, at Belmullet from two to three tons per statute acre. In one plot at Clifden affected tubers which were previously rolled in lime were planted in clean soil, and sixty-seven per cent. by weight of diseased tubers was obtained. This percentage is about the same as was found when badly attacked tubers (untreated) were planted in clean land, but the difference in appearance between the two lots of diseased tubers was very marked. Where lime was present the attack was severe in character on the tubers (canker form): where it was absent they were much less seriously diseased (spot form). There is therefore no doubt but that lime, particularly when applied to an affected soil, strongly favours the disease.

The following table gives the results accruing from the treatment of affected "seed" with certain disinfectants, the treated "seed" being subsequently planted in clean land:—

Plot.	Treatment of "Seed" Potatoes.	Yield of diseased tubers.
3	No treatment. "Seed" only slightly affected.	54.1
4	No treatment. "Seed" badly affected.	67.1
7	Soaked in formalin solution (1 : 600) for 3 hours.	2.6
8	Soaked in Copper Sulphate Solution (1%) for 3 hours.	0
9	Do. followed by rolling in slaked lime.	4.4
10	Soaked in and covered with precipitate of Burgundy Mixture. 3 hours.	2.0
11	Surface wetted and rolled in flowers of sulphur.	1.03

In addition to the above methods of treatment, affected tubers were also moistened and rolled both in calcium cyanamide and in superphosphate. In the former case the treatment resulted in the production of absolutely no plants; in the latter only one-fifth of the tubers produced plants, but these gave a crop of tubers absolutely free from *Spongospora*.

From the table it will be seen that in all cases the treatment of the seed tubers resulted in a most satisfactory checking of the disease. With regard to plots 8, 9 and 10, where copper salts were used, the total yield of tubers was, however, quite considerably reduced. The best yield was given with the formalin treatment, and the next best with sulphur. Of these two, perhaps, the sulphur treatment would be the easier to carry out in practice.

Turning now to the question of soil disinfection the following table presents a summary of the plots laid down and of the results obtained. The soil in each plot was known to be thoroughly infested with the organism, and the "seed" used was not only absolutely clean, but was twice disinfected with formalin before planting, to make assurance doubly sure:—

Plot.	Treatment of affected Soil.	% by weight of diseased tubers.
14	No treatment.	39
15	Lime, four tons per Statute Acre.	52.3
16	Watered with 1% copper sulphate solution. 2 gallons per sq. yard, 2-3 weeks before planting.	17.3
17	Do. but subsequently treated with milk of lime to precipitate the copper sulphate.	19.1
18	Same as 16, but 1.1% copper sulphate solution used.	40.3
19	Do. subsequently treated with milk of lime.	34.4
20	Chloride of lime, 1 lb. to 10 galls. water applied 2-3 weeks before planting.	46.3
21	Calcium cyanamide, 4 lbs. per sq. perch, worked into soil 2-3 weeks before planting.	39.1
22	Gas-lime. 4 tons per Statute Acre, applied similarly.	57.6

From the table it is evident that none of the methods tried gave satisfactory results. The amount of disease was increased by lime, chloride of lime, and gas lime. The treatment with copper sulphate, it is true, brought about a partial reduction of the scab, but also some reduction in the total yield. Chloride of lime and gas lime also caused a very serious reduction in total yield.

Judging from the results obtained with sulphur and with superphosphate it would seem probable that acidity may have something to do with the checking of the disease, and it is possible that by the use of acid manures the scab could to a certain extent be held in check.

Turnips, swedes, mangels, carrots and parsnips were also grown on land known to be infested with *Spongospora*, but none of these plants became attacked, and up to the present the organism has not been found on any plant other than the potato.

"BLACK SPECK," OR "RHIZOCTONIA" SCAB.

Hypochnus Solani Prill et Delacr.

It is quite common to find on the surface of potato tubers little dark brown bodies of irregular shape, which become jet black when wetted, and which resemble particles of soil. These bodies do not

INVESTIGATIONS ON POTATO DISEASES.

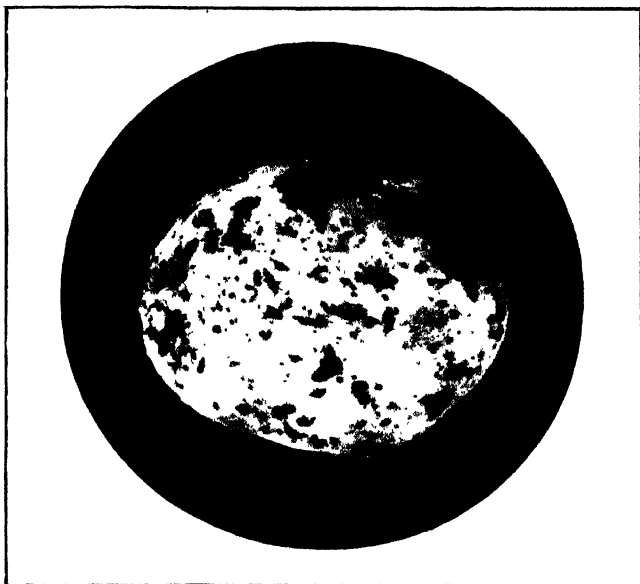


Fig. 11. A potato tuber badly affected with Black Speck Scab. The black bodies are sclerotia of *Hypochnus Solani*

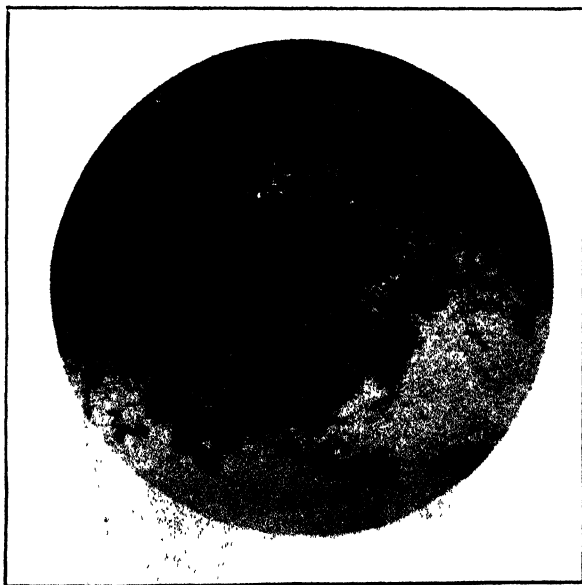


Fig. 12. Portion of a similarly affected tuber, magnified, showing the sclerotia and mycelial threads of *Hypochnus Solani*.

INVESTIGATIONS ON POTATO DISEASES.



Fig. 13. A potato set which was planted and failed to grow owing to attack of sprouts (blackened tips) by Collar Fungus, *Hypoclinus Solani*.



Fig. 14. Base of a potato stalk showing the Collar Fungus, *Hypoclinus Solani*, just above soil level.

adhere particularly firmly to the potato skin, for they can be scratched off with the finger nail, or, in many cases, even rubbed off with a brush, and when removed they leave no perceptible scar on the skin. A potato tuber covered with these bodies is shown in Fig. 11.

In the early stages of their formation these bodies are whitish at least on the surface, and when a tuber bearing them is lifted from the soil an appearance is often presented as if particles of limy material were adhering to the skin. With a strong lens or a microscope it is easy to see that brownish, thread-like structures proceed from these bodies, and often form a loose net-work over the surface of the tuber. These threads are the mycelium or spawn of a fungus to which long ago the name *Rhizoctoma Solani* was given. The blackish bodies are thickened, compacted portions of this mycelium, and are known as sclerotia. These sclerotia have, of course, nothing to do with those of the Stalk Disease fungus (*Sclerotinia*), although they have occasionally been mistaken for them. Figure 12 is from an enlarged photograph showing the sclerotia and the mycelial threads. Beyond rendering the tubers somewhat unsightly the fungus apparently does but little harm, for although it has been claimed by some observers that it causes a wet rot of potato tubers, this has not as yet been found to occur in Ireland. It does not appear to be capable of penetrating the skin of the potato, as is the case in the nearly allied species, *R. violacea*. Under certain circumstances, however, it may prove harmful, and an instance where this was the case is shown in Fig. 13. Here the tips of the young developing sprouts were killed off by the fungus, the mycelium of which had entered the tissues and was forming new sclerotia on the killed parts. The premature death of the tips of the main sprouts caused the growth of secondary ones, most of which in their turn also succumbed, so that probably no stalks would eventually have been produced from this set. It seems that in the United States of America this fungus causes serious losses in this way.

**Connection
with the
"Collar"
Fungus.**

For a long time the fructification of the fungus was unknown, but in 1891 Prillieux and Delacroix described a fungus which forms a kind of white incrustation or felt-like covering at the base of the potato stalks close to the ground, and which they named *Hypochnus Solani*, which is also known as the Potato Collar Fungus. It was observed in considerable quantity at the Clifden station and elsewhere during the season of 1909, and recorded for the first time in Ireland in that year. Some explanation of the fact of its having been overlooked up to that time is perhaps to be found in the circumstance that it has occasionally been taken to be the mycelium of

Stalk Disease fungus (*Sclerotinia*), which, as has been previously pointed out, is not infrequently found at the bases of the stalks. The "Collar" does not persist for any great length of time, but as the season advances it disappears. This white, collar-like, felt of mycelium around the base of a potato stalk is illustrated in Fig. 14. It consists of loosely interwoven branched threads which bear spores, which fall off and thus reach the soil. Most of the threads are colourless, but others are tinged with a brownish colour, and it was found possible to follow individual threads of this spore bearing mycelium from the collar down the outside of the potato stalk to the portions below ground. It was found that when the mycelium got below ground it became coloured in the fashion typical of *Rhizoctonia*, and further, individual threads were traced to sclerotia of this fungus. This was done in the case of a small tuber, one portion of which protruded above the ground and bore the collar fungus upon it. An unbroken connection between individual spore-bearing threads (hyphae) of the collar and the sclerotia on the surface of the submerged portion of the tuber was made out without any difficulty. A case in which a carrot bore the same Collar Fungus was also carefully investigated, and it was clearly proved that the mycelium forming the "collar" was continuous with that of typical *Rhizoctonia* threads running somewhat plentifully over the surface of the carrot root. Hence there is no doubt that the "Collar Fungus" (*Hypochnus Solani*) is merely the fructifying stage of what has hitherto been known as *Rhizoctonia Solani*. These observations confirm the work of Rolfs* in America, who showed, by means of cultures from the spores, that the Collar Fungus is the fructification of this *Rhizoctonia*. Instead, however, of retaining the generic name *Hypochnus* for the fungus, American workers have transferred the latter to the genus *Corticium*, a change which it seems hard to justify, for the structure of the fructification is undoubtedly not that of a *Corticium*.

A considerable number of attempts were made to cultivate the fungus at Clifden, both on artificial and natural media of several kinds, and under varying conditions of moisture, temperature, etc. Spores were present in abundance, and they germinated exceedingly well, but after a short germ tube had been produced growth invariably ceased, for reasons which it was found impossible to determine. The fungus is spread both by means of these spores and also by means of the sclerotia on the tubers. Experiments have been carried out in America which show that these sclerotia can be killed by soaking "seed" tubers in certain disinfectant solutions, but the

* Rolfs—Potato Failures—Agric. Expt. Sta., Colorado, Agric. College, Bull., 91, 1904.

amount of real damage done in this country by this fungus is, so far at least as is known at present, scarcely sufficient to justify the trouble and expense which would be incurred by such treatment.

LEAF ROLL AND "CURL."

The investigations on "Curl" commenced in 1909 were continued during the past season. It was found possible to distinguish clearly in what is commonly called "Curl" two distinct diseases, for one of which the name "Curl" may be retained, the designation "Leaf Roll" being a suitable one for the other. The observations made so far show that "Curl" is not a parasitic disease at all, but is a condition of the plant in which the foliage is perfectly green and apparently healthy, but owing to the absence of proper growth in the veins the leaflets remain crumpled and the plants as a rule remain dwarfed. "Curl" shows itself very early in the development of the plants, and the later developed foliage tends to be less curly than that produced earlier, or in other words, the "Curl" becomes less pronounced as the season advances. The disease is transmitted through the tubers, and has been observed in greatest amount where the same variety has been grown for a prolonged period on the same farm without the introduction of fresh seed-tubers. Up to the present it has been seen in "Champions," "Black Skerry," "Lord Tennyson," and "Red Cups."

"Leaf Roll" is a very different disease. As a rule it does not make any appearance until well on in July, or even August, and it becomes more pronounced as the season advances. It is characterised generally by a lightness in the colour of the newer foliage, accompanied by a rolling inwards of the leaflets from their edges, so that their under surfaces becomes exposed to view. The symptoms are not unlike those of Black Stalk Rot, and as in this case, so with Leaf Roll if the stalks be cut across the three principal vascular bundles are usually found to be of a brown colour, but there is no rotting at the base of the stalk below ground. As was reported last year, in the cases of Leaf Roll examined, the vascular tissues of the plant were found to be invaded by the fungus *Verticillium albo-atrum*. In one instance this fungus was actually traced into a tuber and found with certainty in the vascular ring at a distance of about two inches from the heel end. This tuber had five eyes, and five sets were cut from it and planted, each in a pot of sterilised soil. One of these sets decayed, but the other four produced rather small plants, in all of which the fungus was found to be present, doubtless having got there from the sets. Although the signs of roll in the leaflets of these plants were not particularly striking, the plants

themselves were poor specimens, and died off early, without doubt on account of the presence of the fungus.

One of the signs of the presence of Leaf Roll, but apparently not an infallible one, is the fact that the vascular ring in the tuber stands out prominently as a brown ring, particularly at its heel end. The produce of a plot of Duchess of Cornwall potatoes grown in Co.

**Disease
Spread by
Tubers.**

Dublin was examined in the autumn of 1909, a small portion of each tuber being cut off from the heel end. The tubers were then separated into two lots, one consisting of those with no brown ring at the heel end, and the other of those in which this ring was well marked. The second lot was then sub-divided into two portions, and the heel ends of one lot of them were cut away until there were no longer any signs visible to the naked eye of the browning. By this means three lots of sets were secured—(a) with no browning, apparently free from disease; (b) with browning, apparently affected, and (c) with the region of browning cut away, *i.e.*, disease apparently removed. These three lots of "seed" were planted in 1910 in three plots at the Clifden Station, where Leaf Roll had hitherto been quite unknown. The result was that this disease occurred in all three plots, showing that it is transmitted by means of the tubers, and also showing that tubers in which the brown ring is absent are not necessarily free from it. The amount of "roll" was worst in the case of the (b) sets; there was very little difference between those of (a) and (c). It is not possible to compare the yields of the three plots with one another, as the numbers and weights of the tubers in each plot were not exactly the same.

The "roll" commenced to show itself during the third week in July, and became very strongly pronounced early in August. The majority of the plants in the plots were attacked, but some few of them remained apparently healthy. A considerable number of cases were examined for the presence of mycelium in the tissues. *Verticillium* was frequently found in the wood vessels of affected stalks, which were browned when seen in cross section. In some cases, however, even where the "roll" was pronounced, the vascular bundles of the stalks were not browned and fungus mycelium was absent. In several of such cases, however, *Verticillium* was found in the roots of the plants. A few cases were, however, met with where the search for mycelium in affected plants was unsuccessful. It is, of course, not easy when lifting a potato plant to obtain its complete root system undamaged, and the lack of success in finding mycelium in certain cases may be due rather to lack of a sufficiently extended search amongst the finer rootlets rather than to the entire absence of the mycelium.

The symptoms of Leaf Roll are certainly those due to lack of

**Leaf-Roll
Probably
Parasitic.**

supply of water and food-making materials to the leaves. This is doubtless due to the choking action of the mycelium of *Verticillium* (and also to thyloses) present in very many instances in the wood vessels. It may also be due to the absorbing organs themselves—*i.e.*, the finer rootlets with their root hairs—being killed or impaired in action by the same fungus. Hence even if mycelium is absent from the stalks it may be present in the roots, and although actual proof is still lacking the evidence at present available seems to point strongly to the view that "Leaf Roll"—at least the form of it examined here in Ireland—is caused by a parasitic fungus which is transmitted through the seed tubers. In many cases of "Leaf Roll" the original "seed" tubers remain hard and are found in this condition when the crop is lifted. Very often, however, the sets decay in the usual way. It was found in some cases that *Verticillium* was present in such decaying sets. Further work is in progress, and it is interesting to note that the same disease was observed causing serious loss of yield during the past season in the variety Black Skerry. The same fungus was obtained from the stalks of a variety known as "Leinster Wonder," which also showed unmistakeable signs of interference with its water supply. Here, however, the leaflets, instead of rolling up, developed brown, dead areas on their blades, which gradually spread and increased, so that ultimately the foliage became quite withered and dry.

Since both of these diseases are transmitted by "seed," and since it is not possible for certain to distinguish healthy from diseased "seed" in these cases, particular attention should be given to securing it from crops where both of these troubles are unknown.

From this report it will be seen that a considerable amount of information has been collected as a result of the work done at the Clifden station. It should be mentioned that the carrying out of the various practical details with regard to the experimental plots was ably done by Mr. R. Y. Smith in 1909 and by Mr. J. J. O'Connor during the following season. Mr. P. A. Murphy acted as technical assistant during last season, and to the efforts of these workers the success of the investigations, which it is proposed to extend over a further season, is largely due.

GEO. H. PETTYBRIDGE.

EXPERIMENTS ON THE SPRAYING OF POTATOES IN CO. LOUTH.

SEASONS 1908, 1909, AND 1910.

In the Eighth Annual Report of the Woburn Experimental Fruit Farm a considerable amount of attention is devoted to a consideration of the manufacture and chemistry of Bordeaux mixture.* The Report states that Bordeaux mixture, when prepared in the usual way, for the spraying of fruit trees and the potato crop, contains a large excess of lime. As a result of this the fungicidal action proceeds more slowly and the spray is not fully effective. The chemical action which takes place in the manufacture of Bordeaux mixture is discussed at considerable length, and the conclusion is arrived at that a mixture as efficacious as the ordinary spray may be prepared by using only two-fifths of the usual amount of sulphate of copper. In order to obtain this most desirable result the Report states that it is essential that only exactly the proper quantity of lime should be used, and that the amount of lime may be most conveniently regulated by using clear lime water.

In the summer of 1908 the writer decided to test these conclusions by means of field experiments.

In County Louth most farmers use soda Bordeaux mixture prepared as described in the Department's leaflet No. 14, and referred to therein as Burgundy mixture. It was, therefore considered advisable to use this material for comparison instead of the ordinary Bordeaux mixture prepared with milk of lime.

The First Experiment (1908).

The soda Bordeaux used contained

- { 8 lbs. sulphate of copper.
- { 10 lbs. washing soda.
- { 40 gallons of water.

and was tested by means of litmus paper, before using, as directed in the Department's leaflet above referred to.

The lime water mixture contained

- { 2 lbs. 14½ ozs. sulphate of copper.
- { 1 gallon of water (to dissolve the sulphate of copper).
- { 39 gallons of clear lime water.

This is in the proportion recommended in the Woburn Report. It is slightly less than two-fifths of the amount of sulphate of copper in the soda mixture so generally used. It could not, however, be

* See also Woburn Experimental Fruit Farm, 11th Report, p. 186.

made stronger owing to the fact that lime dissolves to only a very limited extent in water.

The exact quantity of lime water to be used was ascertained by testing with Potassium Ferrocyanide, as directed in the Woburn Report.

Experiments were conducted at the following centres:—

Name and Address of Farmer.	Character of Soil.	Variety of Potato.	Date of 1st Spraying.	Date of 2nd Spraying.
J. H. McArdle, Rampark, Dundalk, .	Light loam,	Up-to-Date	Last week in June.	3rd week in July.
J. McAlestre, Drumcashel, Castlebell'g'm	Medium „	Scottish Triumph.	1st week in July.	„
A. J. Jeffers, Castlebellingham, .	„ „	„	„	„
J. T. Dolan, Ardee, . . .	„ „	Champion,	„	„

Plots were taken at each centre as follows:—

Plot (1.) Unsprayed (at Mr. McArdle's only). Size of this plot $\frac{1}{20}$ th statute acre.

Plot (2.) Sprayed twice with Woburn Bordeaux Spray, at the rate of 120 gallons per statute acre at each spraying. Size of plot, $\frac{1}{3}$ rd statute acre.

Plot (3.) Sprayed twice with Soda Bordeaux Spray, at the rate of 120 gallons per statute acre at each spraying. Size of plot, $\frac{1}{3}$ rd statute acre.

In these, as in all subsequent experiments, it is hardly necessary to state that the spraying of all the plots at each centre was invariably commenced and concluded on the same day. All the above plots were inspected in the month of September, but no difference could be observed in the appearance of the haulms on the Woburn and soda plots, at any of the centres.

Fortunately for growers, but unfortunately for the purposes of the experiment, there was very little blight in County Louth in 1908. The comparison between the two sprays in that season could not, therefore, be regarded as in any way conclusive. In addition to this, the writer found it impossible to supervise personally the weighings at all the centres. Under these circumstances it was decided to postpone publication of the results until further experiments had been made.

The results obtained at the two centres in which the potatoes were weighed will be found in Table I.

At the remaining two centres no difference could be observed in the two plots at the time of lifting, either as regards the proportion of diseased tubers, or the weight of the crop per acre.

The preparation of the lime water (Woburn Bordeaux) mixture, in practice, was found to be rather more troublesome than was anticipated, chiefly owing to the number of barrels necessary for the preparation of the clear lime water. This difficulty ceased to exist in 1909

**The
"Woburn"
Mixture.**

owing to the appearance on the market of a material known as Woburn Bordeaux paste, prepared and sent out in jars and barrels by Messrs. Voss & Co., Millwall, London, E. This material, the authors of the Woburn reports state,* when mixed with water, makes a spray which is practically identical, both chemically and physically, with freshly prepared Woburn Bordeaux mixture, except that it contains no excess of lime.

The following letter, written by Mr. Pickering, Director of the Woburn Experimental Fruit Farm, appeared in a pamphlet by Messrs. Voss :—

“ WOBURN EXPERIMENTAL FRUIT FARM,

“ March 10th, 1909.

“ In answer to your enquiries, the relative efficiency of what is known as the Woburn Bordeaux Mixture, which you are now putting on the market in the form of a paste, was given in our Report as two-and-a-half times, as great as that of the ordinary Bordeaux Mixture, made by mixing equal weights of Copper Sulphate and Lime. This ratio was based on a consideration of the nature of the main reaction occurring when the substances are exposed to air, but it was impossible without direct trials to ascertain how far these reactions proceeded, or to what extent secondary reactions modified the results. An examination of these reactions has now been made, and I am not altogether surprised to find that the relative efficiency of the Woburn Bordeaux Paste is much greater than had been previously stated. My results show that 1 lb. of Copper Sulphate in the form of the Woburn Bordeaux Paste is equivalent to from 9 to 14 lbs. of Copper Sulphate in the form of the freshly made ordinary Bordeaux Mixture (the exact equivalent depending on the conditions under which it is made), or to at least 8 lbs. of Sulphate (probably much more) when in the form of dried Bordeaux Mixture.”

Elsewhere† it is stated that the Woburn Bordeaux is much more efficient, and the ordinary mixture much less efficient, than was supposed, and that, therefore, the relative efficiency of the former is much greater, the efficiency of the two being, at least, about 12 : 1 instead of $2\frac{1}{2}$: 1.

* Woburn Experimental Fruit Farm, 11th Report, p. 61.

† Woburn Experimental Fruit Farm, 11th Report, p. 59.

In these circumstances it was decided to use Woburn Bordeaux Paste in the season of 1909, instead of the Woburn Bordeaux mixture prepared with lime-water as in 1908, the two being practically identical.

**The Second
Experiment
(1909).**

The amount of paste used was that recommended by Messrs. Voss—15 lbs. per 100 gallons of water. This quantity is also recommended by Mr. Pickering.*

Plots were taken as follows:—

Plot (1.) Unsprayed (size of plot, $\frac{1}{10}$ th statute acre).

Plot (2.) Woburn Bordeaux Paste.

Plot (3.) Soda Bordeaux (Burgundy) mixture prepared as in 1908.

Plot (4.) Milk of lime, Bordeaux mixture, prepared as recommended in the Department's leaflet No. 14, *i.e.*, containing—

{ 8 lbs. Sulphate of Copper.
4 lbs. quick lime.
40 gallons of water.

Plots 2, 3, and 4 were each $\frac{1}{3}$ rd statute acre in extent. They were sprayed twice with their respective mixtures, at the rate of 120 gallons per statute acre. The first spraying was done during the first week of July, and the second spraying a fortnight later. The results of the experiment are given in Table II.

It will be seen that in the majority of cases the potatoes sprayed with Soda Bordeaux mixture kept green longest; they also produced an average of 6 cwt. more sound potatoes and 4 cwt. fewer diseased tubers per acre than those sprayed with Woburn Bordeaux paste.

Owing to the fact that potato blight was not nearly as prevalent as usual during the summer of 1909, it was considered that the results obtained were still not sufficiently conclusive, and it was, therefore, decided to repeat the experiments during the season of 1910.

**Result of
Second
Experiment.**

Unfortunately for farmers, potato blight during the year 1910 proved as virulent as it had been comparatively innocuous during the two preceding years.

**Third
Experiment
(1910).**

In many places in County Louth, unsprayed potatoes were completely stripped of their leaves by the end of July. The past season must, therefore, be regarded as almost ideal for the testing of spraying materials.

As in 1909, all plots were sprayed at the rate of 120 gallons per statute acre, of the mixture, at each spraying.

* Woburn Experimental Fruit Farm, 11th Report, p. 66.

POTATO EXPERIMENT.—

COUNTY

TABLE I.—Showing

Name and Address of Farmer.	PLOT 1. Unsprayed.							
	Saleable.		Small.		Diseased		Total.	
J. H. McArdle, Rampark, Dundalk,	T. 18	C. 12	T. 3	C. 12	T. 0	C. 18	T. 18	C. 2
J. McAlester, Drumcashel, Castlebellingham, .	—	—	—	—	—	—	—	—
Average yield per Statute Acre,	—	—	—	—	—	—	—	—

POTATO EXPERIMENT.—

COUNTY

TABLE II.—Showing the Returns

Name and Address of Farmer.	Character of Soil.	Variety of Potato	PLOT 1. Unsprayed.			
			Saleable		Small.	Diseased.
J. H. McArdle, Rampark, Dundalk, .	Light loam.	Up-to-Date, .	T. 10	C. 6	C. 31	C. 20
A. J. Jeffers, Castlebellingham, .	Medium „	British Queen, .	—	—	—	—
W. Finnegan, Whitestown, Greenore, .	Medium „	Up-to-Date, .	—	—	—	—
P. Woods, Boher, Greenore, . . .	Light „	Up-to-date, .	—	—	—	—
Do.,	Light „	Champion, .	—	—	—	—
J. Mackin, Millgrange, Greenore, .	Light „	Up-to-Date, .	—	—	—	—
G. Brophy, Ardee,	Medium „	Scottish Triumph	—	—	—	—
Average yield per Statute Acre,	—	—	—	—	—	—

* Haulms on unsprayed plot died down first, then those on Woburn plot. There was no
 † Soda Bordeaux plot kept green longest. ‡ Soda Bordeaux plot kept green longest.
 plots similar.

POTATO EXPERIMENT.—

COUNTY

TABLE III.—Showing the Returns

Name and Address of Farmer.	Character of Soil.	Variety of Potato.	PLOT 1. Unsprayed.			
			Saleable.		Small.	Diseased.
Wm. Grills, Peterstown, Carlingford, .	Limestone loam,	Up-to-date, .	T. 9	C. 9	C. 20	C. 9
J. H. McArdle, Rampark, Dundalk, .	Light loam,	„ .	6	12	27	3
Jas. Byrne, Tullydonnel, Dunleer, .	Light loam,	Champion, .	4	8	17	2
J. Mackin, Millgrange, Greenore, .	„	Up-to-Date, .	—	—	—	—
Average yield per Statute Acre,	—	—	—	—	—	—

* Unsprayed plot died down first, followed soon afterwards by the Woburn paste plot. The soda
 followed soon afterwards by the Woburn paste plot. The soda plot remained green much longer.

SPRAYING TEST, 1908.

LOUTH.

Returns per Statute Acre.

PLOT 2. Woburn Bordeaux Mixture.				PLOT 3. Soda Bordeaux Mixture.			
Saleable.	Small.	Diseased.	Total.	Saleable.	Small.	Diseased.	Total.
T. C. 12 1	T. C. 4 15	T. C. None	T. C. 16 16	T. C. 12 19	T. C. 5 18	T. C. None	T. C. 18 17
9 16	2 13	0 4	12 13	10 0	2 15	0 4	12 19
10 18	3 14	0 2	14 14	11 9	4 6	0 2	15 18

SPRAYING TEST, 1909.

LOUTH.

per Statute Acre from each Centre.

PLOT 2. Woburn Bordeaux Paste.				PLOT 3. Soda Bordeaux Mixture.			PLOT 4. Milk of lime Bordeaux Mixture.		
Saleable	Small.	Diseased.		Saleable	Small.	Diseased.	Saleable.	Small.	Diseased.
T. C. 11 18	C. 16	C. 14		T. C. 12 8	C. 18	C. 5	T. C. 12 19	C. 18	C. 6*
13 9	23	Nil		13 1	20	Nil†	-	-	
8 19	15	24		10 6	17	12‡	-	-	-
11 0	12	22		12 5	13	14§	-	-	-
11 1	42	Nil		10 0	25	Nil§	-	-	-
11 15	7	2		11 15	4	5**	-	-	-
10 19	8	Nil		11 6	8	Nil††	-	-	-
11 6	17	9		11 12	15	5			-

difference between Plots 3 and 4—they kept green longest. † Both plots similar.
 § Woburn plot kept green longest. ** Soda Bordeaux plot kept green longest. †† Both

SPRAYING TEST, 1909.

LOUTH.

per Statute Acre from each Centre.

PLOT 2. Woburn Bordeaux Paste.				PLOT 3. Soda Bordeaux Mixture.			PLOT 4. Milk of lime Bordeaux Mixture.		
Saleable.	Small.	Diseased.		Saleable.	Small.	Diseased.	Saleable.	Small.	Diseased.
T. C. 9 8	C. 34	C. 9		T. C. 9 8	C. 31	C. 3	T. C. 11 1	C. 34	C. 2*
7 6	28	3		8 11	36	1	10 12	28	1*
4 17	18	5		5 8	27	1†	-	-	-
5 2	9	1		7 17	7	1‡	-	-	-
6 13	22	4‡		7 16	25	1‡	-	-	-

and lime plots remained green much longer. † Unsprayed plot died down first,
 ‡ The Woburn paste plot died down much sooner than the soda plot.

At centres 1, 2 and 4 two sprayings were given, the first during the first week in July, the second, a fortnight later.

At centre 3, only one spraying was given, this being applied during the second week of July.

At centres 2 and 4, all the plots were $\frac{1}{3}$ rd of a statute acre, except the unsprayed plots, which at centre 1 was $\frac{1}{20}$ th statute acre.

At the other two centres all the plots were $\frac{1}{20}$ th statute acre.

The results of the experiments are given in Table III.

As will be seen, the haulms in every case died down much sooner on the plots sprayed with the Woburn paste than on those sprayed with the soda or lime Bordeaux.

Result of Third Experiment. This was so marked that, even at the time of lifting, a distinct difference in the appearance of the withered stalks could be observed. In addition to this the weeds had grown up more vigorously on the Woburn plot, owing to the early decay of the haulms. On the average of the four centres the plots sprayed with the Soda Bordeaux, or Burgundy mixture, gave 23 cwt. of saleable potatoes more and 3 cwt. of diseased potatoes per statute acre less than the plots sprayed with Woburn paste.

The Woburn Bordeaux paste proved, therefore, not nearly as efficient as soda or lime Bordeaux mixture, made up

Conclusion. as recommended by the Department in leaflet No. 14, and farmers should accordingly continue to prepare their mixtures at home exactly as they have done during past years. In conclusion, the writer wishes to express his indebtedness to those farmers whose names appear in the experimental returns, and without whose co-operation and assistance these trials would have been impossible.

A. W. OLDERSHAW.

PROTECTION AGAINST PLANT DISEASES IN IRELAND.

The history of legislation in this country dealing with the subject of Plant Diseases and Insect Pests dates from the year 1877, when the "Destructive Insects Act" was passed with the view of preventing the introduction of the "Colorado Beetle" (*Doryphora Decemlineata*). Under the provisions of this Act the Lord Lieutenant in Council was empowered to make any Order considered expedient for the purpose of regulating or prohibiting the importation of potatoes and potato haulms—or other material, the landing of which

Legislation. might be likely to introduce this pest—and also of providing for the disposal or destruction of any crop which might become infected. Two Orders were accordingly issued in August, 1877, viz., "The Colorado Beetle (Ireland) Order, 1877," and "The Colorado Beetle, Customs (Ireland) Order, 1877." The first-named Order required, under penalty, the immediate notification of the appearance of the Beetle on any potato, or other crop, or substance, and declared it unlawful for any person to sell, or offer for sale, or keep, any living specimen of the Beetle. The latter Order prohibited the importation into this country of any potato haulms, stalk, or leaf coming from Canada, the United States of America, or Germany, and empowered the Customs Authorities to order the destruction of any collection of sand, earth, etc., or any other rubbish imported with potatoes from any of the countries named. Subsequently by Section 2 (b) of the Agricultural and Technical Instruction (Ireland) Act of 1899 the powers vested in the Lord Lieutenant under the Destructive Insects Act were transferred to the Department of Agriculture and Technical Instruction for Ireland.

In 1907 the Destructive Insects and Pests Act was passed, extending the provisions of the Act of 1877 to include all insects, fungi, or other pests destructive to agricultural or horticultural crops. The Department have availed themselves of their powers in this respect to make three orders:—

I. The American Gooseberry Mildew and Black Currant Mite (Ireland) Order, 1908 (dealing with the diseases American Gooseberry-Mildew (*Sphaerotheca mors-uvæ*) in Gooseberries, and Black Currant Mite (*Eriophyes Ribis*, otherwise *Phytoptus Ribis*) in Black Currants.

II. The Black Scab in Potatoes (Ireland) Order, 1908 (dealing with the disease Black Scab (*Chrysophlyctis endobiotica*) in Potatoes.

III. The Foreign Potatoes (Ireland) Order, 1910.

These Orders require—

(1) That immediate notification be made to the Department by the occupier of the appearance of either of the scheduled diseases on any bush, plant, etc., on his premises.

(2) That free access be afforded to any Inspector of the Department or other duly authorised officer to any premises on which he has reason to believe

(a) that disease exists.

(b) that bushes, plants or other materials have been introduced in contravention of the terms of one of those Orders, or

(c) that bushes, plants or other materials to which these Orders apply are kept or stored or offered for sale.

(3) That any bush, plant, or other materials on which any of the scheduled diseases has appeared, be immediately destroyed, or that such other measures be adopted as the Department may require, and

(4) That any other measures be adopted which the Department may prescribe with a view to the prevention of the spread of any of the specified diseases.

In these Orders provision is also made to regulate the importation into this country of any bush, plant or other material with which the diseases in question might possibly be introduced. Under the first-named Order, gooseberry or currant bushes may not be landed in this country without a licence from the Department. Under the remaining two Orders, the importation of potatoes (including potato haulms, etc.) from the Continent of Europe, and the importation from Great Britain of potatoes affected with the disease, Black Scab (*Chrysophlyctis endobiotica*) are absolutely prohibited.

In 1909 the Weeds and Agricultural Seeds (Ireland) Act was passed. Part I. of this Act empowers the Department, with the consent of the County Council concerned, to make an Order declaring that throughout any county all or any of the plants, Ragwort (*scnecio Jaccbaea*), charlock (*sinapis arvensis*), coltsfoot (*Tussilago Farfara*), thistle (*Cnicus sp.*), or dock (*Rumex sp.*) are noxious weeds for the purposes of the Act. In the execution of the Act, the Department may require the destruction of these weeds within a specified time. The second part of the Act gives the Department certain powers in regard to the taking and testing of samples of agricultural seeds offered or exposed for sale, and the publication (with the names and addresses of the suppliers) of the results of such tests. This power indirectly checks the spread of noxious weeds, as it tends to check the sale of the lighter and cheaper classes of seeds, especially those mixtures sold under such names as "Hay," "Brown Hay," etc., which usually contain a large proportion of weed and other seeds injurious to agriculture.

The administration of these Acts and Orders is carried out by officers of the Department, both on the central **Administration.** executive and the extern inspectorial staff, numbering in all 35 officers. In addition the various County Committees of Agriculture throughout the country employ Instructors in Agriculture and Horticulture (to the number of 74) who, as well as acting in these capacities, perform the duties of officers of the Department under the several Orders above-mentioned. These officials visit frequently the farms and gardens in their districts and advise the owners as to the best methods of cultivation and the precautions to be observed with a view to protecting their crops from attacks of plant diseases and destructive insects. Should they in any places discover plants, etc., affected by disease, or pest, the facts of the case are at once reported by them both to the local authorities and to the Department, and they subsequently see that the remedial and preventive measures prescribed by the latter in such instances are carried into effect.

The Department further arrange for the special inspection at regular intervals of the stocks of gooseberry and currant bushes in Irish Nurseries. In the event of any outbreak of the diseases mentioned being discovered in a nursery the sale or removal of any bushes, cuttings, etc., from that nursery is prohibited under penalty until such time as the entire stock is found to be healthy and free from disease and all danger of infection has been removed.

A Seed Testing Station has been established in Dublin by the Department at which the samples of seed taken under the provisions of the Weeds and Agricultural Seeds (Ireland) Act are tested for purity and germination. Farmers and seedsmen throughout the country can have samples of seed tested and reported upon at this Station on payment of a nominal fee. Examinations are also undertaken and reports supplied free of charge on specimen plants submitted by farmers and suspected of being affected with plant diseases. With this establishment is connected a temporary station for the investigation of plant diseases, particularly those affecting the potato plant, situated at Clifden, County Galway. Experimental work of a similar nature is also undertaken at the following institutions under the control of the Department:—

The Royal Botanic Gardens,
Glasnevin, Dublin.

Albert Agricultural College,
Glasnevin, Dublin.

Agricultural Station,
Ballyhaise, Co. Cavan.

Agricultural Station,
Athenry, Co. Galway.

Agricultural Station,
Clonakilty, Co. Cork.
Avondale Forestry Station,
Rathdrum, Co. Wicklow.

Experiments are conducted both directly by the Department and by the Itinerant Instructors at private farms, etc., through the country. Such experiments are mainly those dealing with trials of anti-parasitical and fungicidal materials. In the western portions of the country these experiments have been more particularly undertaken in connection with the disease, Black Blight, in potatoes (*Phytophthora Infestans* de Bary), and numerous experiments have been carried out to test the efficacy of the various spraying mixtures recommended to check the spread of this disease.

It must be noted that this Blight is by far the commonest and most serious plant disease in this country with which agriculturists have to deal. Though this disease has been known in this country for about sixty years it was not until about twenty years ago that general action was taken to prevent its spread and to minimise its disastrous effects. Since its establishment the Department has unceasingly urged upon farmers the necessity of early spraying of the crop as a preventive of disease, with the result that in every portion of the country spraying has come to be regarded as one of the ordinary indispensable operations in the cultivation of the potato crop.

In the "Congested Districts" in the west of Ireland, where the welfare of the small occupiers in any season depends to a great degree on the success or failure of the potato crop, the proper and timely spraying of the crop is a matter of vital necessity, and special arrangements have been made by the Department to enable farmers to carry it out. In addition to the County Instructors and a staff of about forty agricultural overseers permanently engaged in these districts special officers are employed during the spraying season to demonstrate and promote in every way the practice of spraying. Knapsack spraying machines are supplied at cheap rates to the farmers, and over 6,500 of these machines have been already distributed in this manner. Materials for the preparation of the spraying mixtures recommended are now procurable even in the most remote districts. The Department have arranged to test for a nominal charge samples of these materials, so that farmers may assure themselves that they are supplied with the proper article.

The Department also have a scheme in operation by which loans are advanced to farmers for the purchase of horse-drawn spraying machines, and many have availed themselves of this arrangement.

There are no other official institutions in this country either wholly or partly subsidised by the Government, with the exception

of the County Committees of Agriculture, whose duties include investigation or other work in connection with plant diseases.

The following publications of the Department deal particularly with the subject of plant diseases:—

- Leaflet No. 9. The Turnip Fly.
- „ No. 10. Wireworms.
- „ No. 14. Prevention of Potato Blight.
- „ No. 47. The Black Currant Mite.
- „ No. 51. The Leather-Jacket Grub.
- „ No. 76. American Gooseberry Mildew.
- „ No. 85. Some Injurious Orchard Insects.
- „ No. 91. Black Scab in Potatoes.
- “Potatoes Diseases in Ireland” (an account of the investigation work carried out at Clifden during the year 1909).

In this connection the article “Investigations on Potato Diseases” in this issue of the JOURNAL (pp. 417 *et seq.*) should also be read.

TECHNICAL INSTRUCTION IN IRELAND.

[* * *The following is the ninth of a series of articles which has been appearing in the JOURNAL on some recently established Technical Schools in Ireland. These descriptive articles relate to centres differing widely in population and needs, and it is believed that they will be of interest and value in view of future developments in towns in which permanent buildings have not yet been provided. Five of the articles dealt with the Belfast Technical Institute, the Technical School, Ballymoney; the Central Technical Institute, Waterford; the Municipal Technical School, Dundalk, and the Municipal Technical School, Londonderry (1). These buildings were new. Three of the articles dealt with buildings already erected, but adapted to meet the needs of Technical Schools in Ballymena, Queenstown, and Newry (2). The article below relates in like manner to a reconstructed building—the Municipal Technical School in Newtownards.*]

TECHNICAL INSTRUCTION IN NEWTOWNARDS.

BY PHILIP A. COLE,

Principal, Municipal Technical School, Newtownards.

PART I.—INTRODUCTORY AND HISTORICAL.

The Newtownards Urban District Council adopted the Technical Instruction Acts in October, 1902, and proceeded to appoint a Technical Instruction Committee, delegating to it all powers exercisable by them under the Acts, except that of raising the local rate. The first meeting of this Committee was held in November of the same year. Prior to this time no instruction of such a kind, under public control, had been given in Newtownards, although some of the manufacturers had established classes in connection with their works, or had assisted their employees to some extent in their studies.

The Committee at once set about devising a scheme; and, after general inquiries from other centres and the help of the Department's Inspector, they drafted one which, it was thought, would meet the requirements of the district. It was then too late to start work for the session 1902-3, but the Committee proceeded with all preliminary negotiations in order that the scheme might be fully established for the ensuing session.

(1) See issue of Department's Journal for April, 1907, Vol. VII., No. 3, page 457; for July, 1907, Vol. VII., No. 4, page 652; for October, 1907, Vol. VIII., No. 1, page 11; and for July, 1908, Vol. VIII., No. 4, page 666.

(2) See issue of the Department's Journal for January, 1908, Vol. VIII., No. 2, page 260; April, 1908, Vol. VIII., No. 3, page 466; and October, 1908, Vol. IX., No. 1, page 76.

MUNICIPAL TECHNICAL SCHOOL, NEWTOWNARDS.

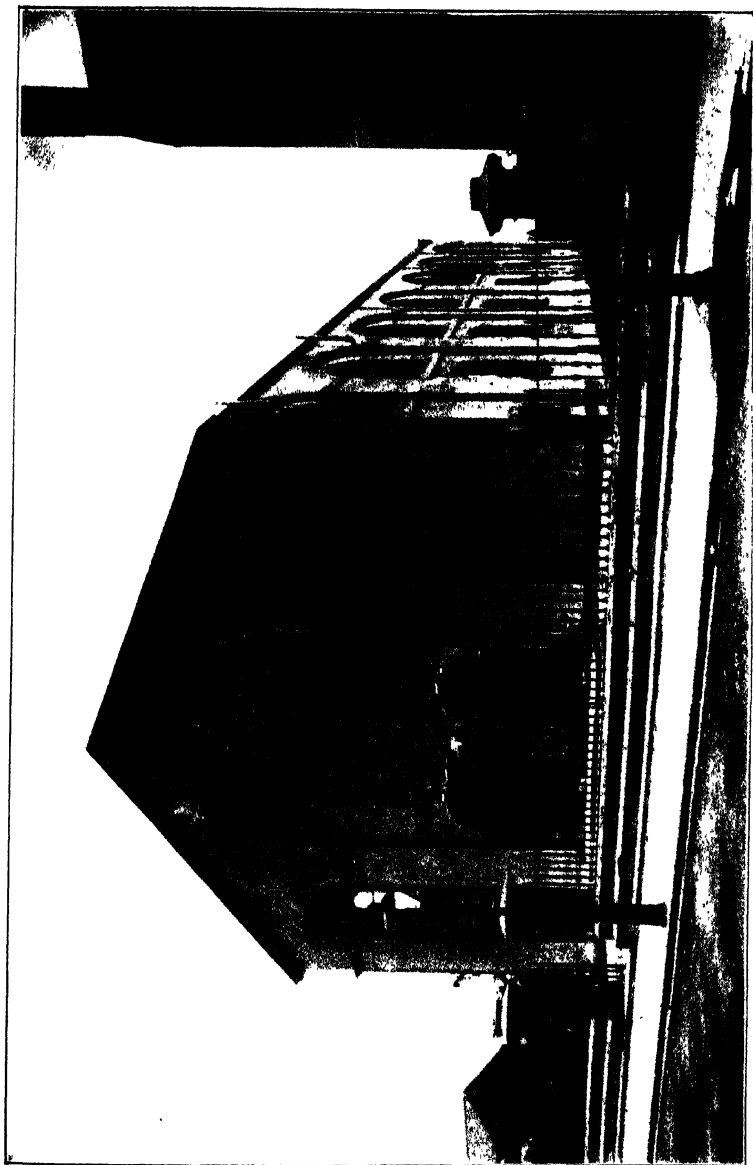


Fig. 1.—Front Elevation of Building.

By May, 1903, development had so far progressed that the Committee decided to appoint a Principal to their School. The post was advertised, the duties being to organize the work of the School to teach classes in connection with the Engineering and Building trades, and to perform the secretarial duties. In August, 1903, the Principal entered upon his duties, and at once proceeded to make arrangements for establishing classes in accordance with the Committee's suggestions.

The Commissioners of National Education kindly granted portions of the Model School in which to hold the classes, and the first session commenced in that building on the 21st September, 1903. The entries outnumbered those anticipated by the Committee, so that it became necessary to divide several classes, and even then considerable overcrowding was experienced. Eventually it was found that the Model School was not altogether suitable for this kind of work, particularly as it was situated at an extreme end of the town. The Committee thereupon began to look out for other premises, centrally situated, and such as could be specially fitted for the kind of instruction under their supervision. After looking through several places, a vacant factory was secured on a lease of six years from the 1st January, 1904. This building was in the centre of the town, and contained four rooms, each 41 feet by 21 feet, whilst an adjoining portion contained three rooms of 21 feet by 19 feet, and a long room 80 feet by 14 feet. The necessary alterations were carried out at a cost of about £200. The arrangement of rooms was as follows:—Ground floor contained the Committee Room, Office and Cloak rooms, Commercial Subjects occupied the first floor, Domestic Economy Section above that, whilst the top floor was reserved for Art classes. Manual Instruction was taught in the long narrow room. The school was declared open on the 19th September, 1904, by Sir H. Plunkett, and, at the same time, he distributed the prizes awarded for the work of the previous session.

As has happened in other cases, the number of entries for the second session was not so great as for the first; but a good enrolment took place, and the change to the new premises was appreciated by the students. During this session the Committee applied for, and were successful in obtaining, a course of Gilchrist Lectures. These lectures were delivered early in 1905, were well attended, and had a beneficial result as regards the work of the school.

The following session—the third—an Evening Continuation School was established under the regulations of the Commissioners of National Education, the object being to help the students, who had left the primary school years ago, to revise their elementary education, and also to assist those who had not been fortunate enough to

receive the full course of instruction in the primary school. Thirty-three students were enrolled, and the class proved a success.

When the Department's New Programme appeared in 1906, the Committee put it into operation for the session

Need of a Special Building. 1906-7. The Evening Continuation School of the previous year was discontinued, as provision for similar instruction was made in the Department's scheme. During the following sessions the work

steadily progressed on the lines laid down; noticeable features were a class in cookery, specially arranged for artisans, conducted at the end of the session 1907-8 (this class subsequently found a permanent place in the curriculum), classes in modern languages, and additional science classes. By this time the Committee thought the school sufficiently well established to justify their obtaining permanent quarters for it, of such a kind as would afford proper facilities for the kind of instruction required. The premises in which the classes were then conducted, though of temporary character only, had given the Committee insight as to the general lines to be followed.

About this time a Presbyterian Church became unoccupied, the Presbytery deciding to discontinue worship in it. After a careful examination, it was considered readily adaptable for a school. The building measured, internally, 70 feet by 42 feet, and 27 feet high to the eaves, and was in a good state of preservation, having been built in recent years. The Committee negotiated with the Presbytery, and eventually decided to purchase it, the price agreed upon being £100. The building had been vested in the hands of trustees, who were now dead, and their executors had either left the country or were also dead. The process of finding the survivors and thus obtaining possession of the building would be not only expensive, but lengthy, as also would that of appearing before the Commissioners of Charitable Donations and Bequests. To overcome this difficulty an arrangement was entered into between the landlord and Presbytery, whereby the former took possession of the building and handed it over to the Committee. This occurred in March, 1909, and the premises were granted to the Committee for a term of 999 years at an annual rent of £8, but during the landlord's lifetime the nominal rent of 5s. a year would be charged. The Committee considered what alterations would be necessary. It was thought that the building, as it stood, though sufficiently large for present classes, would hardly provide for extension of the scheme. As some alterations would, in any case, be necessary, it was finally decided to carry out these, and make the extensions at the same time. The Principal of the School undertook the preparation of all necessary plans and specifications, which were duly submitted to and approved by the Department. A Local Government Board Inquiry was held in June, and a few weeks

later sanction was obtained for the borrowing of a sum of £1,400, an amount considered sufficient. To obtain this sum, the Urban District Council had to guarantee a rate of 2d. in the £ for its repayment, and this was done. The contract was advertised for tender, and eventually the tender of a local firm for £1,300 was accepted. The work was started in September, 1909. Owing to the peculiar nature of the ground, the Committee decided that only by piling could a secure foundation in the extended portion be obtained, and about £100 was spent for this purpose. As the Committee's lease of their present premises expired at the end of the year, every effort was made to have the new building ready for occupation by the new year. By extending the Christmas vacation this was managed, and work was recommenced in the new school about the middle of January, although the contractor had not completed the alterations. Temporary lights were fixed, and all the heat available was from stoves, but the students showed their appreciation of the promised improvements by steadily continuing their studies, despite these temporary disadvantages.

PART II.—DESCRIPTION OF THE BUILDING.

The building, when complete, measured 104 feet long, and the width remained as before; the additional portion being that occupied by the Domestic Economy and Art Rooms. The plans were prepared with a view to making the minimum change in the existing building; and the alterations consisted chiefly in putting in an upper floor, and dividing the building by partitions. It will be noticed that the corridors are not exactly in the centre of the building (Fig. 2), by this arrangement rooms varying in size were secured. The following is the arrangement of the building and the size of the rooms:—

BASEMENT.

Heating Chamber, 21 ft. by 8 ft.

GROUND FLOOR.		Area sq. ft.
2 Cloak Rooms and Lavatories, each	15 ft. by 10 ft. 6 in.	157½
1 Store Room,	10 ft. 6 in. by 6 ft.	63
1 Class Room,	21 ft. by 19 ft.	399
1 Manual Instruction Room,	21 ft. by 30 ft.	630
1 Domestic Economy Room,	42 ft. by 28 ft.	1176
1 Teachers' Room,	15 ft. by 13 ft. 6 in.	212½
1 Committee Room and Office,	15 ft. by 27 ft.	405
1 Enquiry Office,	8 ft. by 7 ft. 8 in.	61
1 Fireproof Room,	8 ft. by 7 ft.	56
Store Room and Lavatory under stairs, each	8 ft. by 7 ft. 6	56

FIRST FLOOR.

Large Class Room,	29 ft. 6 in. by 21 ft.	619½
Mech. Drawing Room,	30 ft. by 21 ft.	630
Art Room,	42 ft. by 28 ft.	1176
Class Room,	18 ft. by 15 ft.	270
" "	22 ft. 4 in. by 15 ft.	335
" "	19 ft. by 15 ft.	285

The Entrance Hall remains in size as in the original building, being 42 feet by 8 feet. Access to the first floor is from the hall by means of two staircases, 4 feet wide, meeting on a landing 18 feet by 8 feet. The cloak rooms are at the front of the building directly off the hall, whilst spaces under the staircase at each side of the building provide a Caretaker's storeroom and Teachers' lavatory respectively. The upper floor is of concrete, reinforced with expanded metal, and rests upon the walls and eight girders, 16 inches by 10 inches, running directly across the building. As it is 42 feet between the walls, it was decided that these girders should be in lengths of 22 feet, pairs being placed across the building at intervals of 15 feet. The ends are built firmly into the side walls, whilst those in the centre of the building meet on the top of, and are supported by, steel stanchions resting on concrete blocks. The cross section of these stanchions is of two channel irons and a joist, consequently support is provided for the corridor partitions and division walls, and, whilst forming part of these walls, there is little or no obstruction in the rooms and corridors. The staircases are of concrete with steel angle irons in each tread, and all are firmly bolted to a string, and bedded in the concrete. The floors of the Cloak Rooms, Fireproof Room, and Domestic Economy Room are all of materials similar to that of the upper floor; elsewhere the original floor is in use. The heating chamber is under the Domestic Economy Room, access to it is by this room, whilst an outside chute is placed for fuel, thereby obviating its being brought into the school. This chamber is below the level of the surrounding land, and is rendered damp proof by a lining of limmer asphalt on the side walls and floor.

The divisions between the rooms are made of "Mack" partitions, finished, to a height of 7 ft., with Keene's cement; above this is plaster, whilst those in the corridors are also of the same material to this height, the upper portion being of glass and wood framing, thereby securing good light both in the corridors and in the parts of the rooms nearest them. The outside walls are finished externally and internally with cement, whilst provision for fastening picture rails, etc., has been made by inserting breeze blocks at suitable places. The height from floor to ceiling in all rooms is 12ft. 6in., except the Art Room; here the ceiling is coved and the height obtained is 18ft. There is almost an entire absence of ornament in the building, the reasons being, firstly, economy, and secondly a desire to have a building which could be kept clean with a minimum amount of labour. It was thought better to defer the painting of walls, in order to allow the new work to thoroughly dry.

MUNICIPAL TECHNICAL SCHOOL, NEWTOWNARDS.

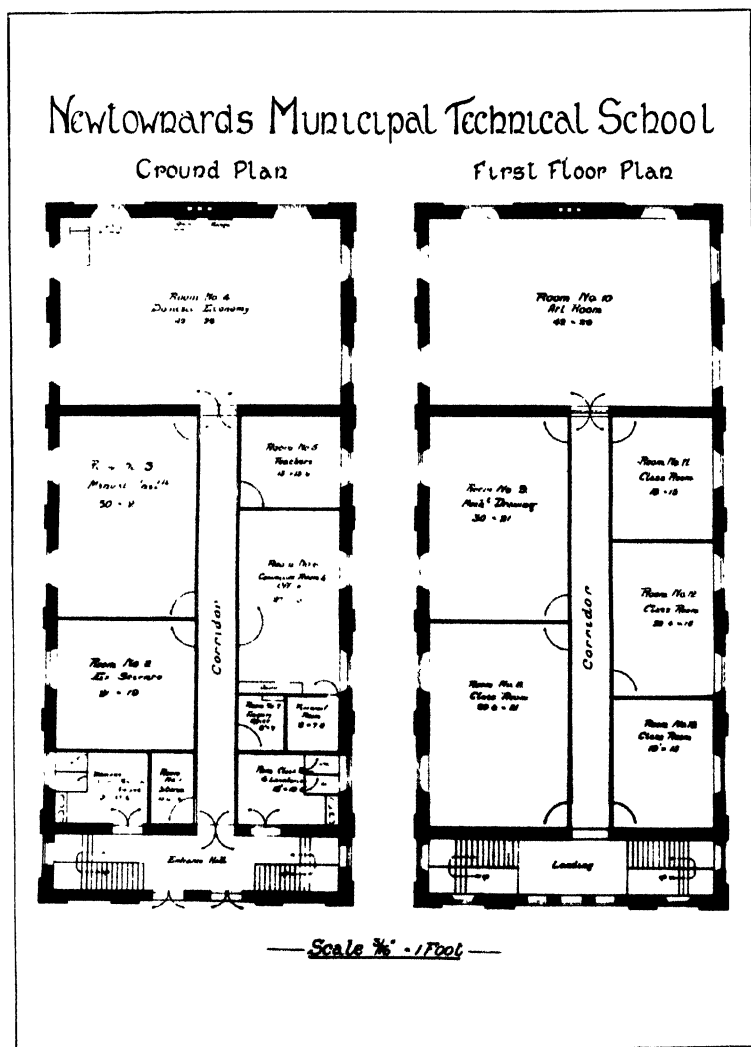


Fig. 2.—Plan of Building.

MUNICIPAL TECHNICAL SCHOOL, NEWTOWNARDS.



Fig. 3.—Corridor on First Floor.

The building is heated throughout by means of low-pressure hot-water pipes, and two column radiators, a flow and

Heating. return, under separate control travelling along each side of the building, whilst each radiator can also be separately controlled, thereby securing uniform temperature. The pipes are taken into the cloak rooms, so that outer garments, if wet, have an opportunity of drying while the students are at work.

Ventilation is obtained by window openers; the windows, being large in size, and high up in the walls, readily

Ventilation. adapt themselves to this purpose; whilst similar openers are placed in the framing in all corridors.

In the original contract, inverted incandescent burners under ordinary pressure were specified, but, on consulta-

Lighting. tion with the Gas Committee of the Urban Council and their Manager, the Committee decided to adopt the Keith high-pressure system. The compressor is fixed at the gas works, and the gas is conveyed to the school in a special steel pipe. The burners used in the rooms are each of 150 candle power, and five of these are sufficient, and give excellent light in a room measuring 30ft. by 21ft. The lights in the corridors are each of 120 candle power. In the Art Room one burner only is used; this is of 1,500 candle power, and, as there is no confusion of shadows, due to several lights, it is specially suitable for this class of work. This system of lighting has given the greatest satisfaction. Not only is there less gas consumed, and consequently less cost, but there is far greater efficiency of light. It may also be added that upkeep in mantles is comparatively small, and that several, fixed in February, 1910, are still in excellent condition. The Gas Committee kindly fitted this system in the school at the net cost.

PART III.—EQUIPMENT.

All furniture procured in the past was designed so as to be easily removable and adaptable to other premises; consequently, the problem of furnishing the new school had been met to some extent. New tables, desks, cupboards, and chairs have been provided, and additional apparatus and furniture are being supplied from time to time as occasion requires.

Dual desks are in use in the Preparatory and Commercial Departments, whilst the latter is supplied with necessary maps, charts, typewriters and office materials. Drawing in connection with the Preparatory Course is taught in the Art Room.

**Preparatory and
Commercial
Departments.**

The Mechanical Drawing Room is fitted with drawing tables and chairs, each table providing accommodation for two students, whilst the apparatus comprises not only the usual models, but samples of material, etc., used in the building and engineering trades.

**Mechanical
Drawing
Room.**

The Art Room is provided with trestles and stools, as well as a number of drawing tables similar to those in the Mechanical Drawing Room, and several stands for the purpose of supporting casts. There is a plentiful supply of casts and models, as well as many common objects, photographs, etc. It is intended to use this room as an examination hall, and also for lectures on subjects bearing upon the work of the classes.

Art Room.

The Committee Room and Office are combined, and are situated on the ground floor near the entrance; from it access to the Fireproof Room is obtained, whilst an Enquiry Office is placed with window, so that the privacy of the office is secured. The office is furnished with tables and chairs, cupboard and roll top desk, and along the partition between it and the Enquiry Office is a large counter fitted with commodious drawers, in which are kept class materials for sale to the students.

**Committee Room
and Office.**

The Manual Instruction Room is fitted with ten single benches, having instantaneous vices at the side, and screw tail vices. The tools are racked on the benches and around the room.

**Manual
Instruction
Room.**

The Domestic Economy Room is fitted with four large tables, each 7ft. 6ins. by 3ft. 6ins., and a demonstration table, 6 feet by 3 feet, and chairs with arms attached for taking notes are supplied. In this room are fitted an open grate, closed range, and gas cookers, so that every section of the community can be taught cookery with

**Domestic
Economy
Room.**

utensils similar to those in use in their respective homes. There are two sewing machines, one worked by hand, a large mirror and a dress stand for use in the dressmaking and needlework classes. It has been found very useful to occasionally hold the French classes in this room, as on account of the number of utensils reference to them can readily be made, and their names in the two languages be noted. No equipment for laundrywork is as yet provided, though this is at present receiving the Committee's attention.

A room in the building is allotted for an Experimental Science Laboratory, but is not yet fitted.

MUNICIPAL TECHNICAL SCHOOL, NEWTOWNARDS.

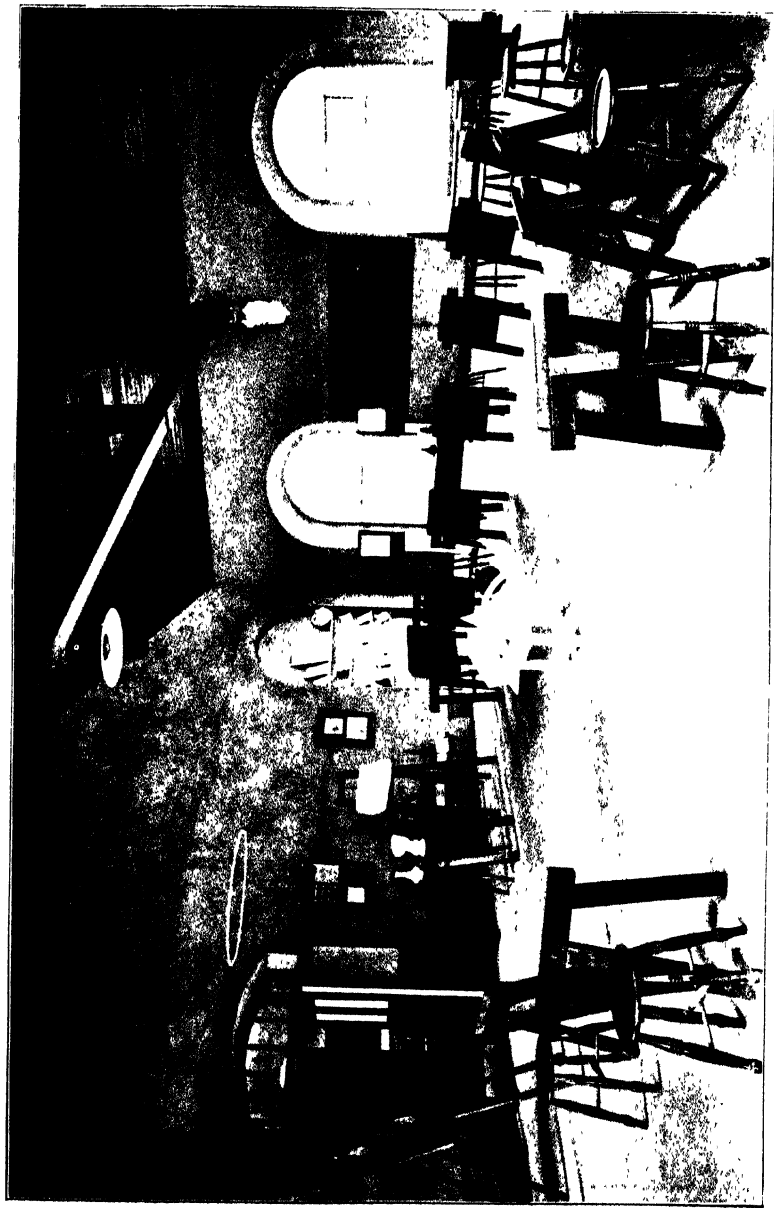


Fig. 4.—Art Room.

MUNICIPAL TECHNICAL SCHOOL, NEWTOWNARDS.



Fig. 5.—Mechanical Drawing Room.

Throughout the school no blackboards are in use; an excellent substitute has been provided in the walls. The Keene's cement coloured answers admirably for this purpose, and a portion four feet broad, running the entire width of each room, gives ample space for teachers' notes and diagrams. The portions of the walls between the windows on the north and south walls of the Art and Domestic Economy Rooms have been similarly treated.

The cost of the building amounts to £1,530. This includes the price paid for the premises (£100). The extensions and alterations, including heating and lighting, amount to £1,416 11s. 2d., and £13 covers the incidental expenses. The heating apparatus cost £121 10s. 0d., and the lighting £31 13s. 6d.

The Down County Committee of Agriculture and Technical Instruction generously made a grant of £150 towards the equipment of the new school.

Though the pupils had been at work in the new school, it was not formally opened until the 31st of May, 1910, when the Marquis of Londonderry performed the opening ceremony.

Opening Ceremony.

PART IV.—THE SCHEME AND ITS WORKING.

The industries in Newtownards are peculiar in this respect, that, whilst giving ample employment for female labour, there is a corresponding scarcity of work for men. The scheme outlined in 1903 has needed little alteration, but it has been extended from time to time. The Committee is a representative body, the members of which are directly connected with the local industries, and consequently are well qualified to advise as to the nature of the instruction necessary for these industries. The following are the chief industries in the district:—Spinning, weaving, bleaching and finishing, printing, hosiery manufacture, cloth weaving, starch manufacture, hemstitching, embroidery, horticulture, and the building and allied trades.

The population of Newtownards is 9,110, its valuation £14,739, and the full value of the 1d. rate is £61.

The objects of the scheme are to provide instruction bearing on local industries, and in other subjects calculated to improve the educational standard of the locality.

The subjects of instruction are:—

Preparatory Course.—English, Mathematics, Drawing, Elementary Science and Manual Instruction in Woodwork.

Commercial Subjects.—Book-keeping, Shorthand, Typewriting, Commercial Geography, Commercial Arithmetic, Business Routine, Economics of Industry, French and German.

Science.—Workshop Arithmetic, Practical Mathematics, Geometry, Machine Construction and Drawing, Building Construction, Carpentry and Joinery, Applied Mechanics, Experimental Science.

Handicraft.—Manual Instruction in Woodwork.

Domestic Economy.—Cookery, Dressmaking, Needlework, Domestic Hygiene.

Art.—Freehand Drawing in Outline, Model Drawing, Elementary Design, Drawing in Light and Shade, Plant Drawing, Geometrical Drawing, Perspective.

SESSION 1909-10.—CLASS RETURNS, ETC.

Course		Total Class Entries.	No. of Individuals.	Attendance Hours.
Preparatory	...	209	66	4186
Commercial	...	99	61	2181
Science	...	21	14	802
Domestic Science	...	140	100	5118
Art	...	24	24	938

YOUNG MEN.—Building Trades, 10; Engineers, 11; Printing Trades, 1; Jeweller, 1; Salesmen, Shopkeepers, etc., 15; Clerks in Commercial Offices, 22; Law Clerk, 1; Teachers, 3; Occupations not included in above classes, 15; Boys just left school, 2; Boys in attendance at school, 20. Total, 101.

YOUNG WOMEN.—Domestic Servants, 6; Dressmakers, Milliners, etc., 6; Textile Industries, Weavers, etc., 2; Factory workers not included in above, 45; Saleswomen, Shopkeepers, etc., 8; Clerks, etc., 14; Teachers, 25; Occupations not included in above, 27; Girls still at school, 14. Total, 147. Total students, 248.

The staff consists of two whole time officers—the Principal and Domestic Economy Teacher—and nine visiting teachers for Commercial work, Art, and Science; of these, three reside in the town, and the remainder come from a distance.

It is interesting to note that, in the session 1903-4, the percentage of students taking one subject was 77.25, those taking two subjects 12.5, and those taking three or more subjects 10.25, whilst during the last session the numbers respectively were 29.1, 35.1, and 35.8. The average number of classes per student was, in the first session, 1.34, and last session, 2. In other words, where the majority of students at first took only one subject, they now enter for a course of instruction, comprising two or more classes. These changes have steadily come about, the increase and decrease throughout the period being constant.

MUNICIPAL TECHNICAL SCHOOL, NEWTOWNARDS.



Fig. 6.—Domestic Economy Room.

MUNICIPAL TECHNICAL SCHOOL, NEWTOWNARDS.

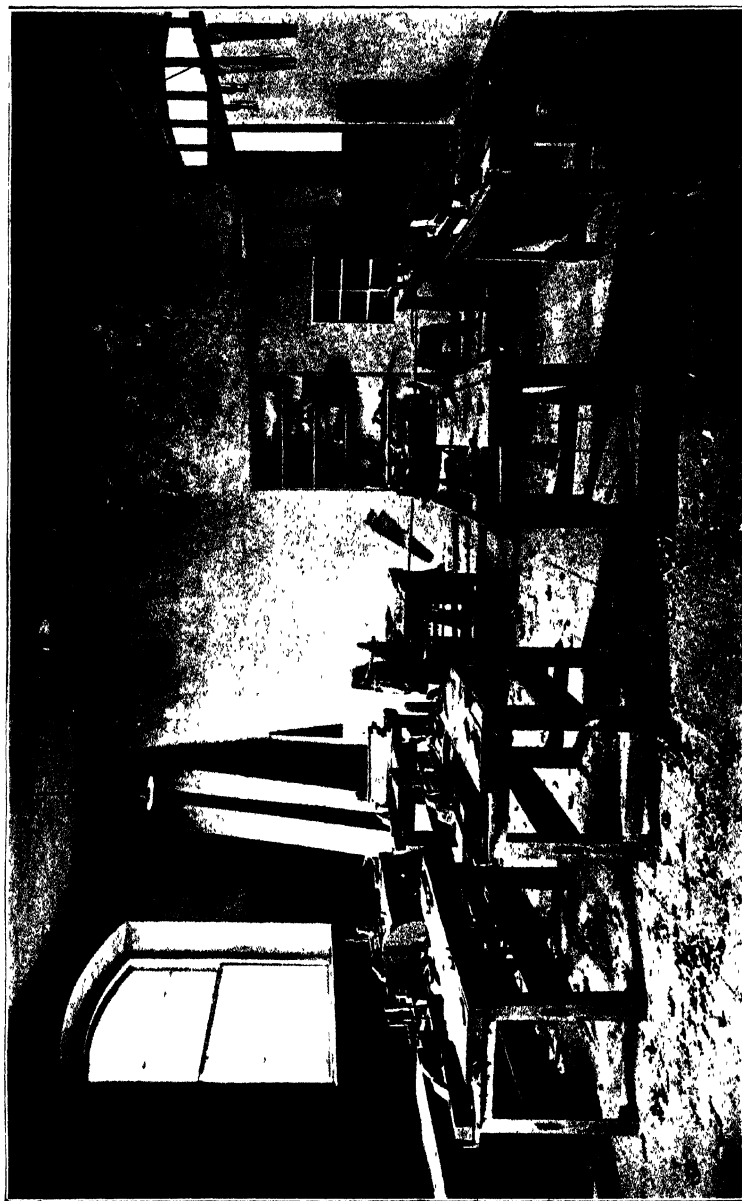


Fig. 7.—Manual Instruction Room.

In the past session the school was one of the centres selected by the Department, where cookery for pupils attending National Schools was taken as an experiment: this worked so well that, in the present session, with the exception of two schools, all the eligible pupils attending the National Schools come to the Technical School for this subject.

The Committee feel that now they have a school admirably suited to the requirements, and sufficiently large to allow for future development. The school has further come to be considered an established factor in the life of the town, and year by year interest in its work becomes more generally apparent. It is felt that the school is only at the commencement of what—without optimism—promises to be its period of greatest usefulness, and that its scope in future will become more enlarged. The appreciation of it, and of the Committee's efforts, is evidenced by the following:—The Urban Council readily guaranteed the additional rate, in order to secure the necessary loan, and, although concerned in large schemes of water and sewerage, remitted one half of the total cost of the gas installation in the school, and also the members of the Ards Presbytery generously refunded the price paid for the building, the only condition attached to the gift being that the money should be used for some specific object, and not merged into the general funds of the school.

SALMON AND TROUT CULTURE.

PART I.*

There is but little known of the early history of the artificial propagation of fish. It is said that the culture of naturally fertilised fish ova was practised from immemorial times by the Chinese, and possibly by the later civilizations of the Romans. The credit of having been the first to fertilize artificially the eggs of fish is sometimes claimed for Dom Pinchon, a monk of the Abbey of Réôme, in the 15th century, but probably his experiments consisted of the collection and incubation of natural spawn. It is generally admitted that the first to practise Artificial Propagation in the modern sense was Stephen Ludvig Jacobi, who, about the year 1741, took the eggs and milt from trout by hand, and blended them together. The eggs were laid down and hatched out in running water in troughs partly filled with gravel.

An account of Jacobi's experiments was published in a Hanoverian paper in 1763, was translated into English in 1788, and appeared in the transactions of the Dublin Society in 1799. (1st Series).

The matter attracted considerable attention in England, but we hear little of any practical results in the form of hatcheries until the middle of the 19th century. The art may be said to have been rediscovered on the Continent about this time, and, as a result of the investigations of Rémy, combined with the good offices of Professor Coste, practical operations on a large scale were commenced at Huningue in France.

Mr. John Shaw, of Drumlanrig, seems to have been the first in the United Kingdom to have fertilised artificially the eggs of salmon. His experiments, which took place in the thirties, were designed to show that the parr was not a distinct species, but merely a stage in the development of the salmon.

Perhaps the name best known in connection with these early experiments is that of Robert Ramsbottom, of Clitheroe, who, in 1852, successfully dealt with a small quantity of salmon ova in England, and in 1853 was employed by the Messrs Ashworth, owners of the Galway Fishery, to conduct operations on a commercial scale. The hatchery was installed near Oughterard, and was carried on

*Part II. will appear in a subsequent issue of the JOURNAL.

successfully for a number of years. The high opinion of its utility, as expressed by Mr. Ashworth in various pamphlets and speeches, must have done much to arouse the interest of owners of other fisheries, and appears to have been largely responsible for the erection in Scotland of similar establishments.

It would be unwise to assert, however, that the improvement in the Galway Fishery was entirely due to the influence of the hatchery; better protection and the removal of certain natural obstacles had doubtless a share in the matter.

The methods followed in these experiments did not differ very materially from those of Jacobi, the object being to imitate nature as closely as possible. The ripe ova from the female fish were discharged, by means of gentle hand pressure, into a basin of water, to which, in similar fashion, the milt from the male fish was added, and the contents of the basin stirred together. In some cases even a more scrupulous imitation of natural methods was adopted, the ova and milt being blended over specially prepared gravel, and in a gentle current of water, and laid down in imitations of the natural redd. We find references to some experiments at Oughterard, where a small stream was stocked with ova laid down in this fashion, and we also learn that the majority of the ova or young fry "fell victims to inroads of the May-fly* larva." In general, we may say that the more scrupulous the attempt to imitate nature, the less successful the result.

These methods were superseded about 1856, when Vrasski, a Russian pisciculturist, found that better results could be obtained by "dry" impregnation, that is, by using no water, but pouring the milt directly on to the ova and then stirring. The principal advantage in Vrasski's method was the increased proportion of fertilised ova, probably about 90 to 100 per cent., as against 60 to 70 per cent. by the "wet" method.

This brief survey practically brings us down to modern times, where development has been chiefly devoted towards improvements in the economical arrangement of the hatchery and its installation.

The present paper deals only with one form of fish culture, that is, the artificial propagation of salmon and trout.

Extent of Artificial Propagation. Almost every marketable species of fish belonging to fresh water, and many purely marine, have been brought under contribution with a view to increasing their natural yield. Some idea of the extent to which this is carried may be gathered from the reports of the Bureau of Fisheries of the United States. The following table shows, in a summarised form, their work for the year 1910.

*More probably the larva of *Dytiscus marginalis*.

SUMMARY OF DISTRIBUTION OF FISH AND EGGS, FISCAL YEAR ENDING
JUNE 30TH, 1910.

Species.	Eggs.	Fry.	Fingerlings, Yearlings, and Adults.	Total.
Cattish,	—	—	544,350	544,350
Carp,	—	—	22,710	22,710
Shad,	2,160,000	89,076,000	—	92,236,000
Buffalofish,	—	—	201,475	201,475
Whitefish,	55,428,000	195,964,000	—	251,392,000
Lake Herring,	1,440,000	70,300,000	—	71,740,000
Silver Salmon,	375,000	10,918,025	—	11,293,025
Chinook Salmon,	37,531,417	16,342,556	67,525	53,941,498
Blueback Salmon,	100,000	121,136,995	21,719,600	142,956,595
Steelhead Trout,	250,000	3,570,287	179,718	3,900,005
Humpback Salmon,	—	1,368,000	—	1,368,000
Rainbow Trout,	536,494	552,716	1,771,128	2,860,338
Atlantic Salmon,	5,000	1,217,366	238,212	1,460,578
Landlocked Salmon,	115,000	985,040	304,364	1,404,404
Blackspotted Trout,	2,748,550	1,765,834	884,154	5,398,538
Lochleven Trout,	—	—	68,248	68,248
Lake Trout,	10,210,000	33,649,622	4,286,150	48,145,772
Brook Trout,	516,000	7,405,545	4,228,461	12,150,006
Sunapee Trout,	—	171,029	—	171,029
Grayling,	25,000	81,000	18	106,018
Pike,	—	—	43,300	43,300
Pickeral,	—	—	500	500
Crappie and Strawberry Bass,	—	—	414,477	414,477
Rock Bass,	—	—	69,985	69,985
Wormouth Bass,	—	—	792	792
Smallmouth black bass	—	537,600	113,305	650,905
Largemouth black bass	—	56,000	679,482	736,082
Sunfish (bream),	—	—	345,635	345,635
Pike perch,	321,455,000	155,025,000	4,760	476,484,760
Yellow perch,	5,200,000	326,885,000	109,245	332,194,245
Striped bass,	4,566,000	2,784,000	—	7,350,000
White bass,	—	—	6,050	6,050
White perch,	16,500,000	338,480,000	—	354,980,000
Yellow bass,	—	—	250	250
Sea bass,	—	808,000	—	808,000
Smelt,	4,500,000	—	9,000	4,509,000
Mackerel,	—	764,000	—	764,000
Freshwater drum,	—	—	11,950	11,950
Cod,	9,854,000	210,354,000	—	220,208,000
Pollock,	—	38,140,000	—	38,140,000
Haddock,	—	712,000	—	712,000
Flatfish,	—	930,755,000	—	930,755,000
Lobster,	750,000	162,505,000	2,052	163,287,052
Total,	474,295,461	2,722,310,215	36,326,896	3,233,392,572

The economic needs of each country, a matter in large part due to geographical position, have largely influenced the trend of piscicultural activities.

Thus in Germany there is a steady demand for fish of any kind, and this is met by the cultivation, on a large scale, of carp. This

fish, and indeed most other inland coarse fish, are practically unsaleable in this country, and such demand as exists can be amply met by natural supplies.

There may come a day when industrial development may render our waters unsuitable save for coarse fish, but at present, with perhaps a few exceptions, any waters suitable for coarse fish are equally so for those of the salmon or trout tribe.

Perch, pike, and their like are, therefore, considered undesirables, as they are a drain on the natural food, even when they do not molest their more valuable neighbours.

Salmon and trout have the double advantage of possessing at once both an economic and a sporting value.

NATURAL BREEDING OF SALMON AND TROUT.

The few facts known in regard to the life history of the salmon are so much a matter of common knowledge that it is unnecessary to repeat them here, while this is no place for entering into any speculation on the controversial points which theoretical deduction has superadded.

Much useful work in elucidating doubtful points has been, and is still being done by the marking of salmon, and by an examination of their scales. Those who are interested in the question are referred to the published works of Messrs. Johnston,¹ Hutton² and Dahl,³ and to the Scottish Irish fishery reports on the subject of salmon marking.

The habits of the breeding salmon, and the times of their entry into fresh water vary in different countries, and in different parts of the same country. Here, taking Ireland as a whole, breeding operations extend roughly from the beginning of November to about the end of January, the bulk of the spawning taking place probably rather before than after Christmas.

There is a tendency for the fish to remain in the deeper parts of the main rivers, until within a comparatively short time before actual spawning, their final movements and their actual spawning location being largely influenced by the early winter floods.

This is a wise provision of nature, as their stay in the smaller streams is somewhat perilous, for their choice often falls on places where they are readily exposed to danger.

The following account of the actual process of natural spawning is taken from evidence given before the Inland Fisheries Commission in 1900.*

¹ Johnson, H. W., 23rd and subsequent Annual Reports of Fishery Board of Scotland.

² Hutton, J. A., *Salmon Scales*, London, 1909.

Do. *Salmon Scale Examination*, London, 1910.

³ Dahl. Knut. Alder og Vekst hos Laks og Orret belyst ved studiet av deres skjael. Kristiania, 1910

* Evidence of E. W. L. Holt, p. 249.

The method of operation appears to be that the female, by a series of motions, drives a furrow into the gravel. At the time when these observations were made a male and female salmon were lying just ahead of that part of the redd which the female had already formed. They lay close, side by side as a rule, except when the male went off to skirmish with another male that occasionally came to the neighbourhood. The method of forming the redd, which is entirely conducted by the female, consisted in this—the female usually lies in the furrow, which is just ahead of whatever part of the redd has already been formed. From time to time she moves forward a few inches, then turns about halfway over, her body slightly curved, the head and tail depressed. The dorsal fin is erect; the belly fins are rigidly outstretched; the gill cover is, sometimes at any rate, distended, while the pectoral fins work vigorously. The body twitches convulsively, and the tail rapidly works in a semi-rotary motion, and in this position she moves forward, not very rapidly, for a distance varying from a foot to a yard—the tail all this time performing its semi-rotary motion in the gravel or sand at the bottom. The pectoral fins seem likewise to touch the gravel and stir it up; but her head, so far as could be seen, never touched it at all. The result of this manoeuvre is that, as she passes forward, a great cloud of sand and gravel is set up; although the observer could not actually see the ova shed, he was convinced that they were shed at that time and no doubt covered by the sand and gravel in its subsequent descent.

The eggs of the salmon, when first extruded, will stick to anything, not in virtue of any sticky slime about them, but simply because they are imbibing water as hard as they can from numerous small pores in the shell, which causes them to stick momentarily to anything they come across, and no doubt, as the eggs are shed by the female into the cloud of gravel, they attach themselves to the stones and are anchored to the ground while other stones fall on them. As far as the female is concerned that is all she does. The furrow is dug and the eggs laid and gravel thrown on them, all in this single process. The whole redd results from a series of such processes. The male lay close beside her as a rule; the only apparent part that he took in the operation was that, as the female moved forward in these proceedings, the male passed sideways over her back, or rather her tail, as he was a little behind her. The process of fertilization probably took place during this movement, but although, when the male was at hand, he always performed this operation, he was by no means always present every time that the female was engaged in stirring up the gravel.

In different parts of the river, in which these observations were made, the gravel varied greatly in size, but it seemed to make no difference to the fish. They were found making redds where the gravel was the size of half bricks, and appeared to be equally content

where the gravel was the size of half-crowns and freely mixed with sand.

Trout have the same spawning habit as salmon, but conduct their operations earlier, with the result that where only one ground is available for both, the eggs of the trout are liable to be rooted up and dispersed by the salmon.

Similarly it may occur that the redds of early spawning salmon may be destroyed by later comers.

There are many other natural dangers to which the eggs are liable; thus floods may carry *debris*, which chokes up and covers the redds, or may totally disperse the redd and its contents.

The opposite danger, temporary droughts, may cause loss, though it seems, that, provided the eggs remain damp, not much damage will be done.

Disease in the form of fungus, or noxious insects may attack the eggs.

Ducks show considerable aptitude in removing the eggs from the redds, while brown trout taken by rod and line in the vicinity of spawning beds are often found to be full of stolen eggs, the condition of their noses revealing the methods by which they had obtained their plunder.

No reliable general estimate can be formed of the damage done in these various ways, but it is obvious that many of these perils may be avoided, where the ova are under human control.

It is sometimes stated that the uppermost parts of a river system are stocked by the eggs of the early running fish which press forward; this is to a large extent true, as the late arrivals, often heavy in spawn, are in no condition to travel far, and have been known to shed their ova in the tidal portion of the river.

The contention, with regard to the early run of fish, is that, unless they are allowed to proceed in their travels, the upper waters will remain unstocked. Where the fry are obtained by means of a hatchery it is possible to liberate them in whatever places may seem to offer the best results, and streams which, owing to natural obstacles or other causes, are not fully stocked by nature, may be brought into use as rearing ground for the hatchery fry.

THE ESTABLISHMENT OF A HATCHERY.

The important points to be borne in mind in the selection of a site for hatchery may be grouped under three heads:—

I. An ample and suitable water supply.

II. Practical certainty of capturing within reasonable distance of the hatchery a supply of spawning fish, and suitable conditions for holding these fish when so obtained.

III. Accessibility of site, which may enable the owner to exercise a controlling influence over the affairs of the hatchery without undue inconvenience to his own business, and will incidentally facilitate dealing with the distribution of the fry.

These are obviously by no means all the points to be considered, but they are some of the most essential.

We propose to discuss these points in the order named.

The water supply must be ample and not unduly affected by floods or drought. Stream or river water is to be preferred to that derived from springs as the temperature of the latter in the winter is usually higher than what prevails in the neighbouring streams, with the result that the ova hatch too early, and the fry have to be turned out before the natural food

supply is sufficiently advanced.

It seems reasonable to assume that the appearance of the feeding fry and their food supply are correlated, and both depend mainly on the temperature of the water.

This drawback more than counterbalances any advantages which may be obtained from the immunity from floods and droughts which springs enjoy. When the water supply is taken directly from a river, the position of the intake must be such that it will not be materially affected by the *debris* brought down by floods, and can be approached for cleaning, etc., under all weather conditions.

The extent to which filtering and settling apparatus must be elaborated will depend entirely on local conditions. Thus the flood water, which contains merely mud or sand in suspension, has no injurious effect on the ova, and provided the sediment does not actually bury the ova, no harm is done. In hatcheries where the Department's pattern boxes are in use, judicious manipulation of the water in the boxes and careful raising and lowering of the trays in the water has been found sufficient treatment.

More elaborate precautions of settling tanks and rough stone filters are in use in some places, but whether they are really necessary is doubtful. The case is different when the water is very deficient in lime, and brings down in flood peaty matter in suspension, which becoming entangled in slime-like algæ, may choke the pores of the zinc trays.

The use of a simple filter made of limestone and sand has proved quite satisfactory in dealing with this nuisance, though it would seem that special attention to the varnishing of the perforated zinc trays is also a factor of importance.

In this country, in so far as fish cultural operations are concerned, there is seldom any question of pollution, and when the water is derived from streams holding a natural stock of fish this point may be almost left out of consideration.

It may, however, be mentioned that the standard of whether a water is or is not suitable for human consumption is not the correct one to apply in regard to its suitability for fish culture.

Water showing a satisfactory sanitary analysis may kill fishes in a short time, and, on the other hand, in rivers fishes are not necessarily harmed by water which any chemist would pronounce unfit from a sanitary standpoint.

What is required, as has been pointed out by an American writer, is a fish-cultural analysis which will cover, amongst other things, information as to the total solids and minerals present together with more particular information as to the atmospheric gases.

This information, when checked by actual experiments, will lead to the establishment of definite standards, useful to fish culture in the same way as the long continued chemical examination of service waters, in the light of the results of their usage, has led to standards, confessedly not well defined, but which are nevertheless useful in selecting sanitary waters.

The possibility of obtaining annually a supply of parent fish

**Number of
Fish
Available.**

wherewith to stock the hatchery is so very essential that it is unnecessary to lay stress on it.

It would seem easy enough to obtain from local residents information as to the possibility of obtaining a sufficient number of fish at the right season, but in point of fact, as experience has shown, it is most difficult. It is most advisable to obtain this information, even if recourse must be had to actual experiment. Where this is done the fish should be marked so that they may not be numbered more than once.

A show of running fish at a weir is very deceptive, the same fish appearing over and over again before success crowns its efforts. We have had experience of this at Rockmills, where the fish are taken when attempting to ascend the weir, and where it was reported that many hundreds of fish could be taken, while in actual fact 100 to 150 fish may be considered an excellent catch during the spawning season.

The most usual methods of capturing spawners are (1) by means

**Methods of
Capturing
Fish.**

of an automatic trap, which, during the netting season, is used for commercial purposes, or by the erection of a trap in a suitable place; or (2) as mentioned above, taking the fish by means of hand nets when they are trying to ascend a weir; or (3)

by netting some pool where the fish have the habit of lying before ascending to the spawning grounds.

All these operations should, so far as possible, be completed before the fish are ripe, as the handling of fully ripe fish is always attended with some risk.

There is another method for the stocking of a hatchery, which was formerly in general use, but fortunately is now not largely practised, that is, to capture the spawning fish on the beds, strip them on the spot, returning the fish again to the river.

The drawbacks to this method are obvious: the fish are in a very delicate condition and quite unfit for the more or less rough handling they must of necessity receive before capture; there is also the possible injury to the redds of fish (white trout, etc.) which have spawned earlier.

This method should only be used in very exceptional cases, as where there is a practical certainty that the redds of early fish will be destroyed by the later spawners, or where the streams chosen by the fish are very small and circumstances render it impossible to protect them adequately.

When such operations are undertaken, they should be under the management of an expert, as the average hatchery attendant is prone to strip fish, whether ripe or not, rather than let them go.

It will have been gathered from these remarks that a holding pond is an essential feature in a hatchery scheme.

A holding pond may be any enclosure in which salmon can live for a few months, and out of which they can be got without much difficulty when wanted. It need not be very close to the hatchery, as, provided the eggs stripped from the fish can be laid down in the hatchery on the same day, the results are quite satisfactory. Its location is really a question which must almost entirely depend on the local conditions, and on the methods by which the spawners are obtained. Thus, when fish are taken in the upper reaches of a main river or from small tributaries, their capture and detention in a holding pond are partly of a protective nature, and the more so according to the inaccessibility of the place.

Some such places as, for instance, Rockmills on the River Funnish, are not frequented by fish save for spawning purposes, and once that period is over no further protection is required.

The case is different where the supply of stud fish is taken in the lower reaches of a river, either by means of a trap or by nets, which are used during the open season for the commercial capture of fish.

Here it is desirable that the holding pond should be as close as conveniently may be to the hatchery, for the men who are employed during the open season should be kept on in some capacity during the close season. The capture of the spawners and general work about the hatchery will afford suitable occupation for some of the hands.

The form of a holding pond varies according to local conditions. Thus, as at Cliff Hatchery, on the Erne below Belleek, a channel of the river has been partitioned off by gratings and embankments. A

system of barriers and leaders, ending in a gate with inscales, attracts the fish ascending and automatically impounds them in the holding pond. They remain here for several months in a satisfactory condition. The pond is a large one, and the only objection is the difficulty in getting the fish out of it, if the water in the river is at all high at spawning time. To some extent this is got over by taking the fish out at any convenient time and sorting them according to size and condition of ripeness into large perforated wooden boxes.

At Sion Mills weir on the Mourne, where fish are taken for the Newtown Stewart Hatchery, the fish captured early in the spawning season, before their ova are matured, are carted in tanks from the weir to the hatchery and held there in a canal, which is partitioned off into sections by movable gratings.

The late run of spawners are held in boxes somewhat similar to those in use at Cliff, and moored above the falls. Their detention is not of very long duration, and under the careful treatment they receive the results are satisfactory. In less capable hands the method would be open to criticism.

At Killorglin,* on the Laune, the holding pond is a channel with a rather deep pool between an islet and the bank of the river, which is here tidal. Fish have been kept there from August, but there is considerable difficulty in bringing them to the pond in good condition, as at that time of the year they are very sensitive to handling.

Salt water in no way checks the maturation of the ova in the fish, though a very slight degree of salinity is sufficient to kill the spawn when extruded.

At some places, as at Cahir on the Suir and at Waterville in County Kerry, fish are held in pens built at the side of the river, and as long as the pens are large enough for the stock, and strong enough to withstand floods, fish seem to content themselves well enough therein.

One objection to any holding pond so placed is that the flow of water through the pens is far more than is necessary and has the effect of unduly exciting the fish, with the result that they are continually working up against the gratings with consequent injury to their noses. This does them no permanent harm, and after a short sojourn in the sea they recover from the temporary disfigurement.

Undoubtedly the most convenient and economic form of pond is an artificial watercourse controlled by sluices and sub-divided by gratings into compartments.

At Rockmills an old mill race has been utilised for this purpose, and for convenience part of it has been divided by gratings into compartments.

* In September, 1900, a number of fish were impounded in the Killorglin Pond, and by accident five of them were not liberated until the end of May, 1910. Before liberation they were weighed and marked with numbered silver labels. One (No. 2562), which weighed 5lbs. when liberated, was recaptured at Killorglin as a clean fish of 12½ lbs. on March 17th, 1911.

The object of the various divisions will be pointed out later on, but it is sufficient to mention here that the actual holding pond section is 232 ft. by 19 ft., and has a depth varying from 18 ins. to 3 ft., according to the manipulation of the water.

The average number of fish held varies from about 100 to 170, and it is capable of holding many times more. However, as it is the habit of salmon in a holding pond to pack closely in one or more favoured spots, it is advisable, where large numbers are held, to break up the pond space into at least two divisions.

Where an old mill-race is not available a pond can be excavated and the water led into it by means of a pipe. This has been done in Banteer, on the Blackwater, where is situate the holding pond for the stud fish of the Mallow Hatchery.

The dimensions of this pond are—length, 138 ft.; breadth, 11 ft. 6 ins. on the bottom and 18 ft. at the surface. It is divided into six divisions, and the fish can be transferred from one section to another by lifting part of the intervening gratings.

All gratings in a holding pond must be carried well above water level to prevent fish jumping them, and they must consist of bars or boards presenting no rough edges, and set, preferably, not more than one inch apart, since a salmon of seven to eight pounds has been seen to go through a two-inch opening without apparent effort.

The amount of water required will vary with the extent and general nature of the pond; a very gentle current, about one-fifth of a mile per hour, is sufficient, and a heavy flow will have the undesired effect of exciting the fish.

The sides of the pond should be about 3 feet or more above the water level, and where the pond has been formed by excavation are best finished at an angle of 45 degrees.

Fish will not, however, as a rule, attempt to jump out unless an excessive quantity of water is being passed through the pond.

If the pond is shallow and has no natural shade, a few hurdles interwoven with sallies may be with advantage allowed to float on its surface.

The accessibility of site has been placed amongst our list of desiderata in the selection of the site for the reasons mentioned, viz., that it will enable the owner to exercise a controlling influence over the affairs of the hatchery without undue inconvenience to his own more personal business, and will also facilitate the distribution of the fry. There are, of course, skilled managers, who can be trusted without supervision, and, where such men are employed, they may be considered as standing in the place of the owner, and all that is required is that their temporary or permanent home should be near the hatchery.

There is, however, no reason why any ordinarily intelligent countryman, a fisherman by choice, should not, with occasional supervision by the owner, be quite able to manage a hatchery successfully.

When all goes smoothly at a hatchery there is little or no trouble attached to its working, but let carelessness or ignorance be present at any stage from the stripping of the fish, or, indeed, from the capture of the spawners, and there inevitably ensues a period of disheartening labour, which ends only with the liberation of the fry, if any have been fortunate enough to survive.

Occasional skilled supervision appears to be the factor which determines success in many cases.

EQUIPMENT OF A HATCHERY.

The hatchery,* into which the fertilized ova are to go, may depend for detail of construction and equipment very much on the taste and purse of the owner, provided that it fulfils the simple requirement of passing a gentle flow of water over the eggs.

Engineering considerations are, of course, of prime importance, and when no head of water can be obtained it is necessary, as at Rockmills, to use floating boxes, with ends and sides of perforated zinc, in which the ova are suspended in trays of the same material.

Such boxes, the invention of Herr Jaffé, the well-known pisciculturist of Osnabrück in Hanover, are usually termed floating redds. They can only be used in channels controlled by sluices, as they are liable to shipwreck, if moored in rivers or streams affected by floods. They are entirely efficient, but entail a certain amount of discomfort on the part of the man who has to look after them. The work of removing dead ova, etc., must be done by kneeling on planks which form an open platform across the stream.

Any neglect in the care of the ova during the early stages is productive of far more trouble with redds than in the case of boxes, and for this reason a reliable man, who will not shirk the work in bad weather, must be employed.

A redd of the pattern (a modification of Jaffé's original design), now in use at Rockmills, costs about £2, and is suitable for incubating about 20,000 ova or for hatching about 10,000 fry.

Whenever a head of water can be got, even if only eighteen inches or two feet, it is best to put the hatching boxes on land, always provided that such land is well above flood level. Local information as to flood level must be received with considerable caution as it is usually inaccurate.

* A full description accompanied by plans of the Lismore Hatchery will be found in *Ann. Rep. Fish., Ireland, 1902-3, Pt. II., App. XI. [1905]*. A model of the hatchery will shortly be on view in the National Museum of Science and Art.

The quantity of water required has never been subjected to exact calculation, and would naturally depend on its composition.

It is probably difficult with the kind of water available in this country to pass too much through the boxes, but provided the eggs are not piled in heaps by the action of the water, a quantity in excess of what is actually required appears to do no harm.

It is better where taps are used to have them of about $\frac{3}{4}$ -in. full-lead and wooden cider taps, if removed and varnished after each season, prove quite satisfactory.

An equally effective and more economical form of tap can be made out of eight-inch lengths of $\frac{3}{4}$ -inch metal piping bent to the required curve. The flow of water can be regulated by plugging the inflow end of the pipe with a cork. At Lismore some taps of this pattern are in use and run full under a head of about 9 inches of water. (See Fig. 1.)

The apparatus for leading the water to the hatchery boxes is simple enough. One needs a sluice at the intake, with a leaf screen to keep out the grosser forms of dirt, and a pipe channel or flume to convey it to the filter or settling tank, if such is used. A wooden flume of strong nine-inch boards, supported where necessary on wooden trestles, posts or rough masonry pillars, is the best contrivance, as it is easily cleaned by taking off the top boards, and if there is an excess of water, it is easy to contrive in the bottom of the flume one or more narrow waste doors, which let out sand, etc., without materially lessening the supply of water to the hatchery. These waste doors may be in connection with inclined screens of coarse perforated zinc, to drive out any floating matter that may get past the leaf-screen at the intake.

Where the distance between the intake and the hatchery is considerable, and cattle are about, it usually comes cheaper to pipe the water underground so as to save the cost of fencing. Whatever the nature of the supply apparatus, there must be some contrivance at its lower end to regulate the amount of water entering the filter.

From the filter or settling tank the water is led to the hatching box by another flume (with a waste weir at its lower end) fitted on one or both sides with taps discharging into the hatching boxes.

The simplest form of hatching apparatus consists of a strong wooden box, about 6 to 8 feet long, about 18 to 24 inches wide, and about 9 inches deep, provided with an outlet near the top of the lower end and a wooden cover. The box is about half filled with fine gravel on which the eggs are laid. Such a box usually contains about 8,000 ova. The general arrangement of a hatchery, where these boxes are in use, will be seen from the photograph of Killorglin Hatchery. (See Fig. 2.) It will be noticed that the boxes are laid on the ground, supported merely on a few stout cross battens. This is necessary on account of the size and weight of the boxes, and, perhaps, desirable

SALMON AND TROUT CULTURE.

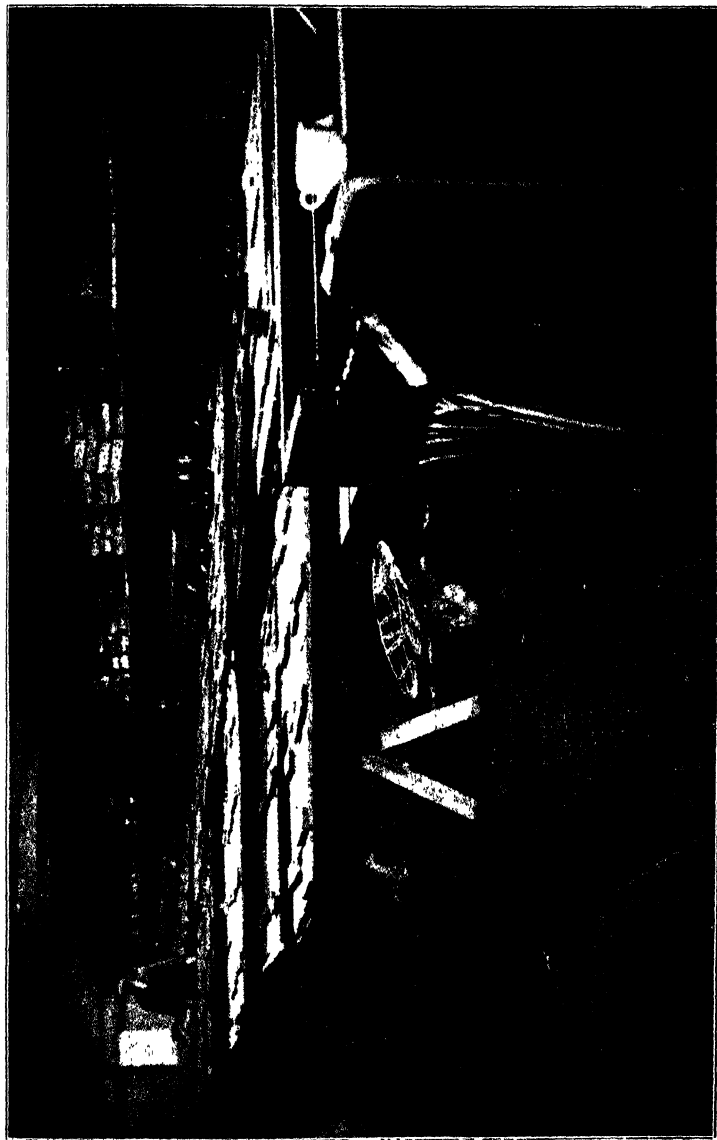


Fig. 1.—Lismore Salmon Hatchery.

SALMON AND TROUT CULTURE.

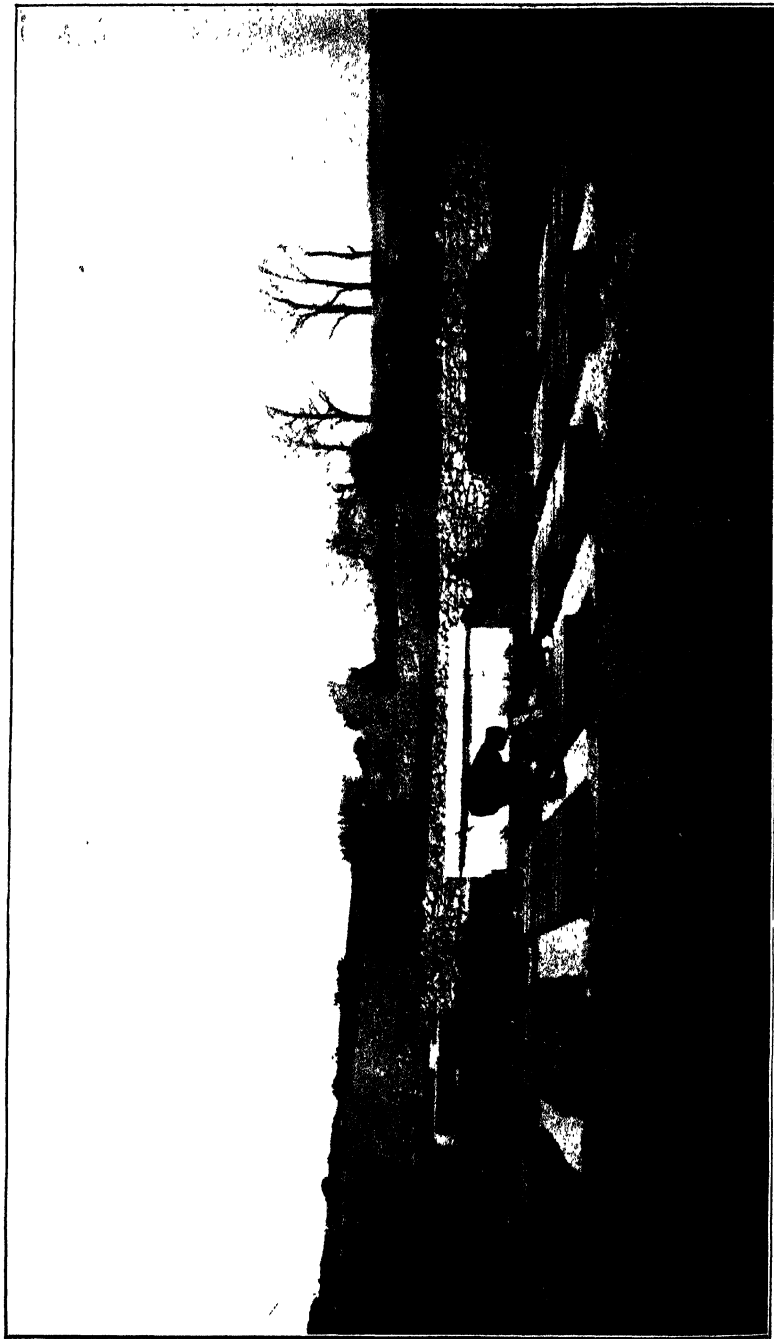


Fig. 2.—Open Air Hatchery, Killorglin, Co. Kerry.

as affording more shelter from wind and storm. Such boxes, if properly cared for, are quite effective and suitable for open-air hatcheries where ground space is not of importance and where the output of fry is not likely to be large. The removal of dead ova and the collection of the fry offer some difficulty, and for these reasons this form of box is unsuitable for use on a large scale.

In all other kinds of hatching box the ova are laid in trays of one kind or another, and wherever the head of water permits, the boxes are placed at a distance above the ground which allows of their being examined with reasonable comfort.

Some people like large, wide, shallow boxes, solidly constructed of concrete, as at Black Castle, Kilrea, Newtownstewart and Screebe. There is nothing against this form of box except its initial expense, nor much in its favour except its durability.

At Kilrea and Newtownstewart the tables are sub-divided into four divisions of about 9 ft. by 3 ft., and there is separate water supply to each table.

Where such troughs or tables are not sub-divided it is best to introduce the water through a sprinkler or perforated pipe, otherwise the amount of water necessary for such large boxes will unduly disturb the ova nearest the intake, and moreover the flow will not be evenly distributed.

The trays used in such boxes are, at Black Castle and Screebe, of woven wire, and at Kilrea and Newtownstewart, of Belleek china perforated with small round holes.

The woven wire trays are economic, because the water passes freely through them, and they will safely hatch more than one layer of ova; but china, besides being costly and fragile, cannot be sufficiently closely perforated for the purpose in hand.

Both china and wire trays are supported in one way or another a little above the bottom of the box, and the boxes are provided with wooden covers.

Probably the most economic boxes are those made of strong wood, and, though firms which make a business of supplying hatching apparatus appear to attach importance to particular measurements, experience seems to show that, provided the box (or longitudinal compartment thereof) is sufficiently narrow to permit of the even distribution of a moderate water supply, the material dimensions are those obtainable from stock scantling with the least amount of waste. The width of the box is practically determined by the size of the sheets of perforated zinc. A box (*See Inset*) has been evolved on these lines, and appears to be entirely efficient. It costs, complete with trays, about £2.

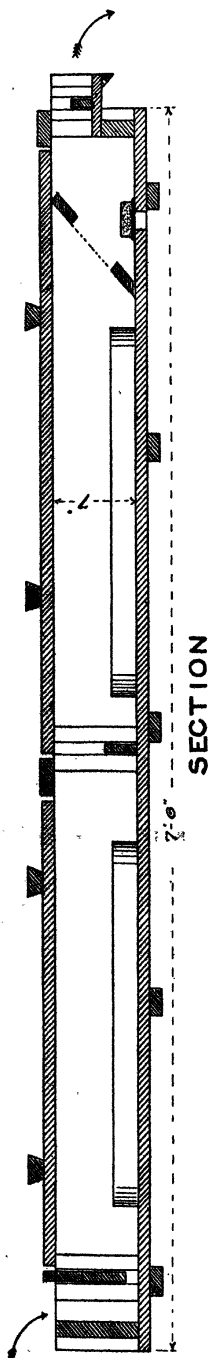
It will be noticed that the box is provided with a series of transverse dams, of which that immediately below the intake does not extend to the bottom. The middle dam is movable, but is intended to be

kept tight against the bottom as long as the trays are in the box, in order to direct the current through the front of the lower tray. The lower dam is in the outlet and, when in place, serves to raise the water above the top of the trays. The latter rest on wooden battens set in the angles of the sides and bottom. They may float when new, and if so must be ballasted with a stone. Between the lower tray and the outlet is a sliding screen of perforated zinc, which is not needed until the fry are hatching. In the bottom, immediately above the outlet, is a sink-hole, closed by a heavy disc of lead served with leather. The trays have the ends and bottom made of a continuous sheet of perforated zinc, with sides and cross battens at top of wood. The boxes are either tarred, varnished or painted outside, and varnished inside. A time-honoured tradition directs that the inside should be charred in order, it is believed, to discourage the growth of "fungus," but it is not clear that this tradition is based on observed fact. The trays must be varnished, and when the zinc is new it must be thoroughly scrubbed with soap or any other detergent in order to get rid of the grease with which manufacturers coat it for purposes of preservation. It is most difficult to get new zinc to take varnish properly, but trays which have been in use for one season generally coat well enough afterwards. In this climate, however, varnish ought to be applied in the spring or early summer. In the various kinds of varnish intended to stand water there seems to be not much difference except price, but the preparation sold as "siderosthen paint" has, on the whole, been found the most satisfactory for hatchery purposes. Unless facilities exist for dipping the trays in the varnish, which should be well thinned, great care must be taken to stipple it into the perforations of the zinc, so as to make a continuous coating. The trays must be varnished afresh every year, but unless the old coat is flaking, it is not necessary to clean it off before the new one is applied. In choosing the perforated zinc, the gauge of the perforation (No. 9) is not the only thing that matters, since some makes are much more closely perforated than others. The thickness of the zinc is also important, as trays of thin zinc give no wear, and are always buckling out of shape.

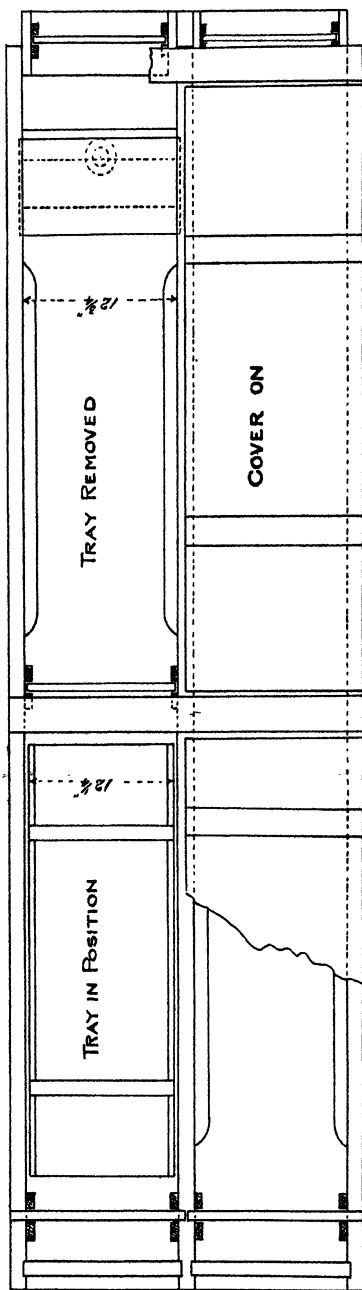
The following is the specification of the quality of zinc which has been found satisfactory:—*Thickness*, No. 14 zinc gauge; *hole*, No. 9; diam. of hole, 0.095 in. or 2.45 mm.; No. of holes to square inch, 70. Such zinc costs about 7s. per sheet, 8 ft. by 3 ft.

As a rule, trays of zinc, with No. 9 perforation, do well enough for all stages of incubation, but where the water supply is favourable to the growth of slime-like algæ and turf *debris* is abundant, it is as well to use trays with larger perforations until shortly before the ova are due to hatch. Oval-hole perforated zinc (No. 28 hole, 15 gauge) is good for this purpose, but the ova must be transferred to the No. 9 hole zinc trays before they hatch, or the fry will tear them-

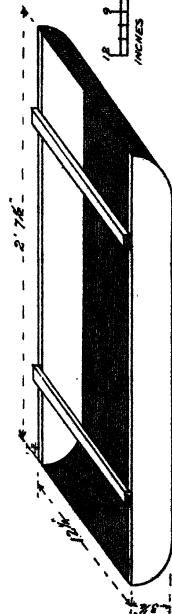
SALMON AND TROUT CULTURE.



SECTION

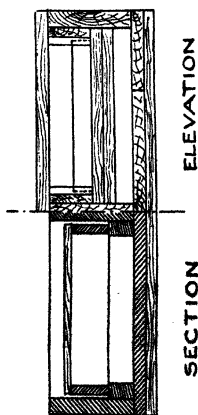
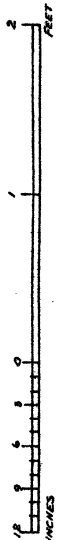


PLAN



TRAY

SCALE



ELEVATION

SECTION

Double Hatching Box—Department's Pattern.

selves to pieces in trying to get through the larger oval holes. Whatever zinc is used, it must be remembered that, as a result of the punching of the holes, one side of it is covered with sharp asperities, and this side must, of course, be undermost, or the ova and fry may get scratched in spite of the varnish.

It is questionable whether a house to contain the hatching apparatus is a necessity in any part of Ireland, as far as the welfare of the ova and fry is concerned; for such frosts as occur are rarely severe enough to stop the water supply, and even when the supply is frozen, the ova and fry seem to take no harm under a light coat of ice in the boxes. There are five hatcheries in Kerry without a roof of any sort, and there is no roof over the redd-hatcheries at Rocknills and Lough Sheelin, but elsewhere hatcheries have roofs and walls of some kind or another, and, perhaps, it really pays to consider the comfort of the attendant.

There must be sufficient light in a hatchery to enable the attendant to see what he is doing when cleaning the boxes and removing bad eggs. Small skylights, especially if provided with blinds, are the most satisfactory. Some people prefer to keep the ova as much as possible from the light, while in one large hatchery in the North the boxes are never covered until the ova commence to hatch. The windows are then darkened by blinds and the boxes partly covered. The ova seem to do equally well under both conditions, though the former is to be preferred, as direct light encourages growths which may be injurious.

TOBACCO GROWING IN IRELAND.

In the issue of the JOURNAL for January, 1909 (Vol. IX., No. 2, p. 228) an article appeared giving a full account of experiments in Tobacco Growing carried out in Ireland, with a detailed statement of the results obtained, and some recommendations regarding the Cultivation and Manufacture of Tobacco. It was decided to supplement the article by issuing a series of leaflets relating to the subject as under:—

- A. *Introductory,*
- B. *Suitable Soils,*
- C. *Curing Barns,*
- D. *Suitable Varieties,*
- E. *Seed Beds,*
- F. *Manures,*
- G. *Transplanting,*
- H. *Cultivation,*
- I. *Harvesting and Curing,*
- J. *Grading, Packing and
Maturing.*
- K. *Marketing.*

The first five leaflets of this series, Leaflets A to E inclusive, appeared in the issue of the JOURNAL for April, 1909 (Vol. IX., No. 3, p. 501), and have been published in separate form: Leaflet G appeared in the issue for April, 1910 (Vol. X., No. 3, p. 471); Leaflets F, Manures, and H, Cultivation, Topping and Suckering appear below.

LEAFLET F.—MANURES.

Manures affect both the quality and yield of tobacco. The production of quantity is comparatively simple, but the control of quality by means of manuring is more difficult with tobacco than with most crops. Colour, texture, size, aroma, flavour, combustibility and the ripening process may all be affected by the manures used. The relative importance of these qualities depends upon the class of tobacco, or, in other words, upon the particular use for which it is grown. Cigar wrapper tobacco has highest standard of quality, for the reason that it should possess in great perfection all of the qualities mentioned above. Cigarette tobaccos are somewhat less exacting as regards all qualities but aroma and flavour. Pipe tobaccos have even a lower standard of quality, and in the production of the cheapest types a large yield is as important as smoking quality.

A crop of 1,000 lbs. of cured tobacco, if the plant stalks be returned to the field, may be said to remove from the soil about 40 lbs. of nitrogen, 6 lbs. of phosphoric acid, and 54 lbs. of potash. From these figures it will be noted that tobacco is a *potash feeder*, and is no more exhaustive to the soil than potatoes, turnips, or mangels. It should not be inferred, however, that these figures represent either the quantity or proportion in which the different plant foods should be supplied to the soil. The composition and condition of the soil must be considered as well as the nutritive requirements of the crop. The facts that phosphate greatly stimulates the growth of tobacco and that potash in excess improves the burning quality of the leaf must also be considered.

There is no single manure or mixture of manures that may be considered most suitable for growing every type of tobacco under all conditions of soil and climate. Experiments indicate, however, that the following formulæ are most generally suitable and economical in the case of a variety of Irish soils:—

First Formula:

- 10 parts of Sulphate of Ammonia guaranteed equal to 7.8% Nitrogen (N.).
- 36 parts of 35% Superphosphate guaranteed equal to 12.5% Soluble Phosphate.
- 24 parts of Sulphate of Potash guaranteed equal to 11.6% Potash (K_2O).

Second Formula:

- 30 parts of Sulphate of Ammonia guaranteed equal to 5.76% Nitrogen (N.).
- 54 parts of 35% Superphosphate guaranteed equal to 17.5% Soluble Phosphate.
- 16 parts of Sulphate of Potash guaranteed equal to 7.60% Potash (K_2O).

The first formula, owing to its large potash content, may be specially recommended for the growing of cigar and cigarette tobaccos. It should also be used for pipe tobacco if the soil is found to produce poor burning quality. The second formula is recommended for general use in the growing of pipe tobaccos. Both formulæ are as concentrated as possible and are, therefore, high priced, but such manures are always the cheapest, since the charges for mixing, transportation, and applying to the land are lower in proportion than in the case of low priced manures, while the charge per unit of plant food, of similar quality, is the same.

As a rule, farmyard manure should be liberally used on all upland soils in order to improve their texture and promote the formation of plant food from the soil itself. For tobacco growing on moory or

peaty soils farmyard manure is not so essential, but occasional dressings are beneficial. The best results will be obtained if the dung is rotted in a heap for at least six months, and then spread on the land previous to ploughing in autumn or winter. When applied in the drill manure should be very well rotted, well spread, and used in moderate quantity. The drills should be opened and closed deep in order to cover the manure well and to permit of chain-harrowing the drills almost level. Good results may be thus obtained. The rate of application should depend upon the fertility of the soil. Initial dressings of 40 and 50 tons may not be excessive on impoverished barley land, and subsequent annual dressings of 15 and 20 tons may be required for ordinary soils continuously under tobacco. The continued use of farmyard manure alone will injure the quality of the tobacco grown, and even single applications of dung alone are not so beneficial to the crop as a combination of artificial and farmyard manure.

Artificial manure should be used primarily as a starter for the purpose of stimulating rapid growth during June and July, and thereby promoting early and thorough maturity. Only quickly available manures should be used, of which sulphate of ammonia, 35% superphosphate, and high grade sulphate of potash, in the proportions recommended in formulæ 1 and 2, have been found most satisfactory. Artificial manure should be applied "back of the screw" at the time the drills are made. The quantity to apply may vary from 4 to 10 cwts. per acre of the mixtures recommended. Less than 4 cwts. is difficult to distribute evenly and is not very effective. If more than 10 cwts. are used it may be broadcasted before drilling, but it is advisable to use farmyard manure instead of an excess of artificial. The practice of applying manure as a top-dressing to the growing crop is not desirable, as it involves additional labour and is liable to cause the plants to mature late.

When tobacco is grown on the same land in successive years, green manuring is a satisfactory means of replenishing the supply of vegetable matter in the soil, and thus reducing the quantity of farmyard manure required. The proper method is to plough the land immediately after the tobacco is harvested, and, without delay, sow rye in the usual manner. If sown before the 1st of November the rye will usually afford considerable pasturage for sheep before the 15th of April when it must be ploughed under. When the land is very wet it will of course be inadvisable to graze the rye. If the rye is sown late it will prove a failure, and if it is not ploughed under sufficiently early it will cause trouble during the preparation of the land for planting.

The plant stalks and all tobacco waste are valuable manure if properly handled. The Excise Authorities require prompt disposal of all

stalks, but permit them to be composted with ordinary farmyard manure. If the stalks are treated in this manner after stripping they suffer no deterioration, and after the lapse of a year are fit to use as manure for tobacco.

Rotation may be recommended for the tobacco crop, provided the best land of the farm has sufficient area, shelter, fertility and freedom from pests. If the best land in these respects is only sufficient to accommodate the tobacco crop, then continuous culture should be adopted until such time, at least, as the shelter or fertility of other parts of the farm may be improved or the pests exterminated. By this means great risks and often serious losses may be avoided.

The foregoing recommendations apply particularly to pipe tobaccos and also to cigar tobaccos if special care be taken as to the quality of the manures used. For cigarette tobaccos it is necessary to manure sparingly in order to prevent the growth from becoming too rank and succulent. This is specially true of Turkish tobaccos.

LEAFLET H.—(CULTIVATION, SUCKERING AND TOPPING.

After the tobacco seedlings have been transplanted in the field and all vacancies filled by prompt replanting, the succeeding operations before harvesting are cultivation, topping, and suckering. In warm climates an additional and important operation consists in combatting insects which feed upon the leaves and cause great destruction. Ireland so far has been favoured in this respect by the absence of any insect which injures tobacco after the plants have once become established and started vigorous growth. A few caterpillars of the species *Hadena oleracea* and *Mamestra brassicae*, which are very general feeders, have been noticed; and occasionally large slugs may seriously injure single plants adjoining headlands, but such attacks are of no practical importance.

The roots of the tobacco plant require an abundance of warmth, air and room. It is very necessary, therefore,

Cultivation. to keep the soil clean, open and fine by frequent cultivation.

It has been found that weed growth really determines the number of cultivations that may be required. Weeds tend to shade the soil and plants, to lower their temperature and to render the atmosphere surrounding the tobacco plants cold, damp and sluggish. These conditions induce diseases and also directly reduce the yield and quality to a serious extent. The most common, injurious and troublesome weed in tobacco fields is chickweed, which produces seed early and very abundantly. Its seed germinates in about one week, and almost before this weed becomes noticeable it has developed an extensive system of roots which makes it extremely

difficult to destroy the plants by ordinary cultivation. It can be controlled, however, by the following procedure; after planting, at intervals of about a fortnight, the surface soil should be lightly yet thoroughly stirred, especially if rains intervene. The ideal time to cultivate is a dry, sunny day when the weeds have just started to grow. In damp or cloudy weather, or if the growth of the weeds is advanced, ordinary cultivation will not be completely effective, and additional cultivation should follow as soon as the weather becomes favourable. It is specially important that the last cultivation should be timely. Shortly before the leaves of the tobacco plants spread to such an extent that further cultivation is prevented, favourable weather should be selected for a thorough and final cultivation. After this stage the growth of the tobacco should check or quite prevent the growth of weeds, but if the final cultivation is neglected, or slighted, the weeds may gain the upper hand during the long interval before harvest. Immediately after harvest, the land should be harrowed in order to destroy any weeds that may be seeding, and to cause a further germination of seed. Subsequent cultivations at intervals during autumn and the following spring will greatly decrease the number of weed-seeds remaining in the soil.

The most important roots of the tobacco plant spread widely through the rich surface soil. They have been traced directly beneath the surface for a distance of over three feet in all directions from the plant stalk. Roots will grow from any portion of the stalk which is covered with soil, and unless the plant is well provided with lateral roots the wide expanse of leaf renders it top-heavy and liable to be shaken or blown over by the wind. These characteristics of the plant largely determine the methods of cultivation which are most suitable for tobacco. The first cultivation should be deep and should extend as near to the plants as possible without shaking or dislodging them. The aim should be to restore the fine, loose, mellow condition of the soil after the packing it received during planting operations. Each succeeding cultivation should be more shallow and farther from the plants in order to avoid injury to the rapidly spreading leaves and feeding roots. The later cultivations should consist in stirring only the surface of the soil as finely and thoroughly as possible. A dry soil mulch or "dust blanket" is a very effective method of warming and aerating the soil, preserving soil moisture, preventing weeds and thereby increasing crop growth. During cultivation the soil should be worked slightly and gradually around the stalks of the plants so as to encourage deep and firm rooting. When tobacco is planted in high drills it will be difficult to prevent the workers from hoeing the soil away from the plants. For horse hoeing the ordinary adjustable drill cultivator is most suitable. It should be fitted with narrow

points, and for raised drills the small double mould board should be attached at the rear. The ordinary rigid drill-grubber for the first cultivation and the common drill-harrow for further cultivations will do satisfactory work if the drills are almost level.

Tobacco plants are usually set farther apart one way than the other so as to permit of horse hoeing as much as possible. It will be necessary, however, to hand hoe, at least twice during the season, the object being to loosen the soil and destroy all weeds which cannot be reached with the horse hoe. The proper kind of hand hoe for tobacco is the heavy, steel, swan-neck hoe. The common turnip hoe and scuffle hoe are very unsuitable and inefficient as they are not adapted to chopping and drawing the soil toward the plants. A good hoe will repay its extra cost in a single season by promoting rapid and effective work.

The tobacco plant has a strong tendency to the production of seed which checks the further development of the leaves. In order to prevent this the plant must be topped by removing the blossom or terminal bud, and with it all leaves in excess of those that the plant can properly develop and ripen. As a result of topping, the leaves increase in size and thickness; they develop a stronger flavour and ripen earlier. The time at which the top should be removed and the number of leaves which should be left on the plant depend on the use to which the cured tobacco is to be put, and also upon the conditions of soil and climate, and the individual characteristics of the plant. In general, the climatic conditions favour low topping of all tobaccos requiring much body or thickness of leaf, such as Pryor, Burley and other varieties grown for pipe-smoking purposes. In order to produce the best results under average conditions each plant of these varieties should bear about ten fully-developed leaves. The cool weather causes the seed head to push out prematurely, but the plant will become nearly full-grown before it is necessary to remove the top. Under normal conditions this should not be done until the first flower has shown. Connecticut seedleaf varieties for cigar bunch wrappers should be topped somewhat higher and later than pipe varieties in order to produce fine thin leaves. The Sumatra variety for cigar wrappers and large-leaved cigarette varieties may have the flower heads removed after most of the leaves have been harvested. This will hasten the maturity of the remaining top leaves. Samos and other Turkish varieties should not be topped at all in order to produce small fine leaves. The proper method of topping is to grasp the plant stalk immediately above what is to be the top leaf, and break the stalk at this point by bending it abruptly downward.

As soon as the plant is topped, or even before, small shoots or suckers start out from the axils of all the leaves.

Suckering. If these suckers be allowed to grow, they will greatly lessen the amount of tobacco produced, and also injure the quality. The cool weather of this country greatly increases the tendency to sucker, especially in the earlier stages of growth. The suckers may require removal soon after the plants start to grow in the field; and at the time of topping another growth may be ready for removal. This operation must then be repeated at frequent intervals until harvest. Until the suckers are five or six inches long they will not do much harm, and at this stage they may be readily broken off by pressing them abruptly sideways with the thumb. This operation should be performed as rapidly as possible, but the suckers should not be gouged out with the finger nails, as injury to the midrib of the leaf may induce rot in damp weather. When the leaves have spread to their fullest extent they may be easily torn or broken off by a person walking rapidly or carelessly through the field. For this reason a worker should sucker and top two rows at once, and should do the work thoroughly so that the operation may not need repeating almost immediately. If topping is not begun too early it may be finished in two operations.

In this climate the bottom leaves of the plant suffer comparatively slight injury or deterioration, and it is, therefore, inadvisable to pull off and discard these leaves—a practice which is known as priming.

G. N. KELLER.

The illustrated report on tobacco growing in Ireland which appeared in the JOURNAL of the Department for January, 1909, has been reprinted separately and may be had free of charge, together with the other leaflets of this series, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Dublin.

THE RURAL EXODUS IN FRANCE.

Perhaps the most striking feature of modern social economy is the ever-increasing tendency of the rural population to desert the labour of the fields and to seek some new and more attractive mode of life elsewhere. The problem of how to check this undue migration from country to town is one of the knottiest which modern economists and legislators have been called upon to grapple with. It is also a matter of vital importance, particularly in countries whose prosperity mainly depends upon their agricultural resources. The steady drain upon the rural population is doubly harmful: it tends to cripple agricultural production on the one hand, and on the other it creates an unnatural situation in the industrial labour market, often resulting in unemployment and general misery.

In Ireland matters have hardly reached the acute stage which they have attained elsewhere, but none the less, the problem is with us, and so it may not be amiss to consider briefly the townward movement and the means by which it is being dealt with in countries other than our own.

In the case of France, an agricultural country, the question has become so acute as to cause the gravest anxiety to all who are concerned in that country's economic welfare. Legislators, economists, social reformers and practical farmers are all wrestling with the problem of how to check the rural exodus, and at least one eminent novelist has written a powerful appeal on behalf of "the dying land."

It is difficult to estimate precisely the rate at which the rural population is moving townwards, but it is stated on good authority that during the last fifty years the proportion of persons engaged in agricultural pursuits in France has diminished by more than one-tenth. The following table shows the gradual decline from 1866 to 1896:—

Extent of Migration to Towns.

Year.	Proportion of population employed at agriculture.		
1866	51.5 per cent.
1872	51.3 "
1876	51.4 "
1881	48.4 "
1886	47.8 "
1896	43.5 "

The question arises as to what becomes of all these people who have left the land. A certain number emigrate, but the bulk of them go to swell the large industrial centres. The movement began about 1846, with the development of railways, and has been going on ever since. Only forty years later, the urban population of France showed an increase of more than $5\frac{1}{2}$ millions, whilst the country districts during the same period showed a loss of 2 millions. It is, therefore, plain that the natural equilibrium of town and country population has been seriously disturbed, and it is pretty generally agreed that the effects of this disturbance are likely to be disastrous. M. Méline, formerly Minister of Agriculture, has even gone so far as to say that the rural exodus is responsible for the three-fold scourge of France: alcoholism, tuberculosis and depopulation. Be this as it may, the matter has certainly passed beyond the merely threatening stage; it has become a real, tangible and ever-increasing social evil. The young men and women of the rural districts appear to dread the thought of facing the future in the fields, and are filled with a longing for city life, the life of the factory worker, the domestic servant, the shop assistant, or, haply, if fate be kind, of the minor public official or "*petit fonctionnaire*," the goal of ambition to many a French provincial. Evidences of a similar trend of thought are not lacking in rural Ireland to-day.

The direct cause of this townward movement seems to be a growing distaste for country life and a preference for the life of the town with its more showy attractions and supposed advantages. The indirect causes are many. In France, and indeed also in Germany, much blame is attached to the system of compulsory military service which annually brings thousands of young men from rural districts to serve their one, two or three years in a garrison town, with the result that many of them never go back to the land at all, and so the most valuable element of the rural population is gradually weakened and drained away. With this aspect of the problem we are, for the present at least, not greatly concerned, but there are a host of other causes at work which offer, at many points, a close parallel to Irish conditions. The inter-relation of these causes and their effect upon rural life in France present an interesting subject of study, but it is impossible to do more than touch upon a few of them here.

We find, in the first place, that the gradual decline of the small domestic industries, which flourished for centuries in the rural districts of France, has removed one of the principal elements of stability in many a country homestead. It has also in some measure given rise to another commonly quoted source of discontent with rural life, namely, the long periods of unemployment entailed by farm work.

In some districts again, complaints are made of the low wages earned by farm labourers, and cases are cited of a man receiving as little as 20 sous (10d.) a day. Other causes mentioned are: absenteeism of landlords, technical incompetence of farmers, and, amongst the labourers, dislike of hard manual toil, combined with a growing indifference and even hostility towards their employers. But it is not the men alone who are to blame; their inefficiency and distaste for country life are, it appears, shared by their wives and daughters. Some, indeed, would throw the greater responsibility upon the women-folk, who, it is said, might change the whole aspect of things if they had a mind to. This is probably going somewhat beyond the mark, although the potential influence of women upon questions of rural economy is undoubtedly great and is beginning to be recognised as an important element in the problem.

Again, the sub-division of holdings, a common practice when an inheritance is shared by several heirs, is a powerful factor in the break up of homes and the uprooting of peasant families, as it lessens the interest in and consequently the feeling of attachment to the paternal acres. This loosening of the bond which formerly held the peasant to his land is attributed by some to the weakening of religious beliefs, combined with that contempt for "plain living and high thinking," and that craving for the cheap pleasures of the town which are only too characteristic of the present generation. Whatever be the cause or causes, there is in France to-day a sad lack of what M. Méline calls "rural mentality," a convenient phrase signifying a genuine feeling for the land and an interest and pleasure in making it productive; in fact, a taste for rural things and the capacity for getting the best out of a life led in the country. How to restore this "rural mentality" is the delicate and difficult problem now being faced in France. Its restoration must inevitably be very slow and gradual, and can only be effected by the earnest and successful co-operation of many forces, moral, educational, economic and administrative.

<p>Attempts to Stay the Exodus.</p>	<p>Within the last couple of years the French Government have passed an important measure, which, it is hoped, will materially help to stem the tide of townward migration; it is known as the "<i>Loi du bien de famille insaisissable</i>," passed in July, 1909.</p>
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This measure in some degree resembles the American "Homesteads Law," and its object is to prevent the uprooting of the small-holder class by enabling them to render their holdings inalienable under the law, that is to say, secure from distraint for debts contracted by the holder. This process is technically known as the "constitution" of an inalienable homestead or "*bien de famille*." The law, which is optional, not compulsory, in its action, is based upon the principle that the homestead shall be "constituted" for the

benefit of the family as a whole, and not for that of any one individual. Moreover, this may be done for any family, whether rural or urban, rich or poor. This is no "class legislation," for the exclusive profit, for example, of the small-holder, although it is hoped that he will greatly benefit by it. The sole requisite is that the family shall be French, or at any rate domiciled in France. Moreover, only one homestead can be constituted for each family.

The property to be constituted as an inalienable homestead under the terms of the new Act must be real estate, and may consist of a house only, or of a house with land. **Holdings to which the Act Applies.** The whole must be occupied and worked by the family. Live stock, implements and other means of agricultural exploitation are deemed to form part of the estate. The value of the entire homestead must not exceed 8,000 francs (£320) at the time of its constitution. If its value is less, it may be gradually brought up to that figure by successive acquisitions, and even should it ultimately exceed that value, owing to the increment arising from altered economic conditions or improvements, the benefits of constitution as a homestead would nevertheless remain intact. Finally, in order to be qualified for constitution, a holding must be free of all mortgage or other encumbrance, as otherwise rights already acquired by creditors might be seriously interfered with. The homestead may be constituted by the head of the family, whether husband or wife, widow or widower, a grandparent who has undertaken the care of his orphan or deserted grandchildren, etc.

The formalities to be observed are as follows:—A deed executed by a notary is required unless the homestead is constituted by will, or by a deed of gift. **Requirements of the Act.** This deed must contain a description and valuation of the holding, and an abstract of it must be posted up for two months in certain specified public places. Moreover, two notices to the same effect must be inserted at intervals of a fortnight in some newspaper competent to receive legal notices. The object of this delay is two-fold. On the one hand, it enables privileged creditors to enter their claims for the guaranteeing of existing debts, and, on the other, it enables ordinary unsecured creditors to oppose the constitution of the homestead. When the specified period has expired, the deed is laid before the magistrate (*juge de paix*), who inquires into and verifies all statements and estimates, considers any objections which may have been lodged by interested parties, ascertains whether the buildings have been duly insured against fire, and, if all is in order, confirms the deed which must then be registered within one month.

The characteristic feature of the homestead so constituted is, of course, the fact of its inalienability. Once the act of constitution is

legally complete, neither it nor its produce can be distrained, even in the event of bankruptcy or compulsory liquidation. It is not, however, privileged in this respect as regards special mortgages, penal fines, taxes, fire insurance premiums and debts contracted for food. The owner of the holding may sell all or part of it, and he may also renounce its constitution as a homestead, but to do this he must first obtain, if married, the consent of his wife, given before the magistrate, and if he has children, the sanction of the " Conseil de famille " or family council.¹

The disposal of a homestead in the event of the death of the constituting party is regulated as follows:—

(1) It remains inalienable for the benefit of the surviving husband or wife, even where there are no children;

(2) If there are children who are also minors at the death of the owner of the homestead, the magistrate may order that the latter shall remain intact as their joint property until the youngest child has attained his majority, but compensation may be allowed to the older children for the delay so caused. This is an important modification of the common law principle that no one is bound to consent to a heritage remaining undivided. It is justified by the consideration that it would have been useless to insure the inalienability of a holding during the life of the owner, only to allow it to be split up immediately after his death;

(3) The surviving husband or wife, if co-proprietor and occupier of the house, may demand that the entire homestead be handed over, at a valuation, for his or her profit to the exclusion of the other heirs.

Finally, the law provides for the creation, under the Ministry of Agriculture, of a Small Rural Holdings Board, which will examine and deal with all matters relating to small rural ownership.

(1) A meeting of related persons, presided over by a magistrate, and held to decide in matters touching the interests of a minor.

THE "BLADDER-RUST" OF SCOTS PINE.

A serious case of disease in Scots Pine was observed during the past season in woods at Cappagh, Co. Waterford. These woods were visited during the second week in June, and a large number of trees were found to be attacked by one of the "bladder-rust" fungi. As a result of the disease, many of the trees are dead, and the remainder of those attacked will ultimately succumb.

The trees are from thirty to forty feet high, and are about forty years old. The position of attack by the disease is in most cases high up on the main trunk, but the branches are also in many cases affected. The attack takes the form of a blistering or swelling and cracking of the bark, accompanied usually by a copious flow of resinous material. It apparently commences at one side of the trunks or branches, but ultimately encircles them, so that they become "ringed." The ring of dead bark was found extending to a width of a couple of feet or more, and, as time goes on, it gradually extends further.

Figure 1 shows the nature of the attack on a branch of about one inch in diameter, and that on the main trunk presents a very similar appearance.

The death of this ring of bark has, as a consequence, the bringing to a standstill of the formation of the annual rings of wood, so that the supply of water and food-making materials to the branches and leaves above the attacked area becomes cut off, and the crown of the tree dies. The gradual progress of the disease down the bark generally leads to the death of the whole tree.

Although several trees were felled, in only one case could specimens of the fructifying bladder-rust fungus be obtained, and these were on one or two small twigs, none being found on the large diseased areas on the main trunk and larger branches. Fig. 2 shows one of these small twigs with the bladders of the fungus on it.

With regard to the fungus which causes the disease, and its life-history, it may be said that it belongs to the group of "rusts," and it is one of those in that group which produce several different kinds of spores, and which, in order to complete its life history (as far as our present information goes), requires two different host plants. There are two principal groups of these bladder-rust fungi which attack coniferous trees, namely, those in which the bladders are found on the needles (leaves), and those in which they occur on the bark of the stem and branches. Formerly they were collectively known under the scientific name of *Peridermium Pini*, the species on the needles being distinguished as *forma acicola*, and those on the bark *f. corticola*.

THE "BLADDER-RUST" OF SCOTS PINE.

**Fig. 1.—Branch of Scots Pine showing result of attack by
"Bladder-Rust" Fungus.**

THE "BLADDER-RUST" OF SCOTS PINE.

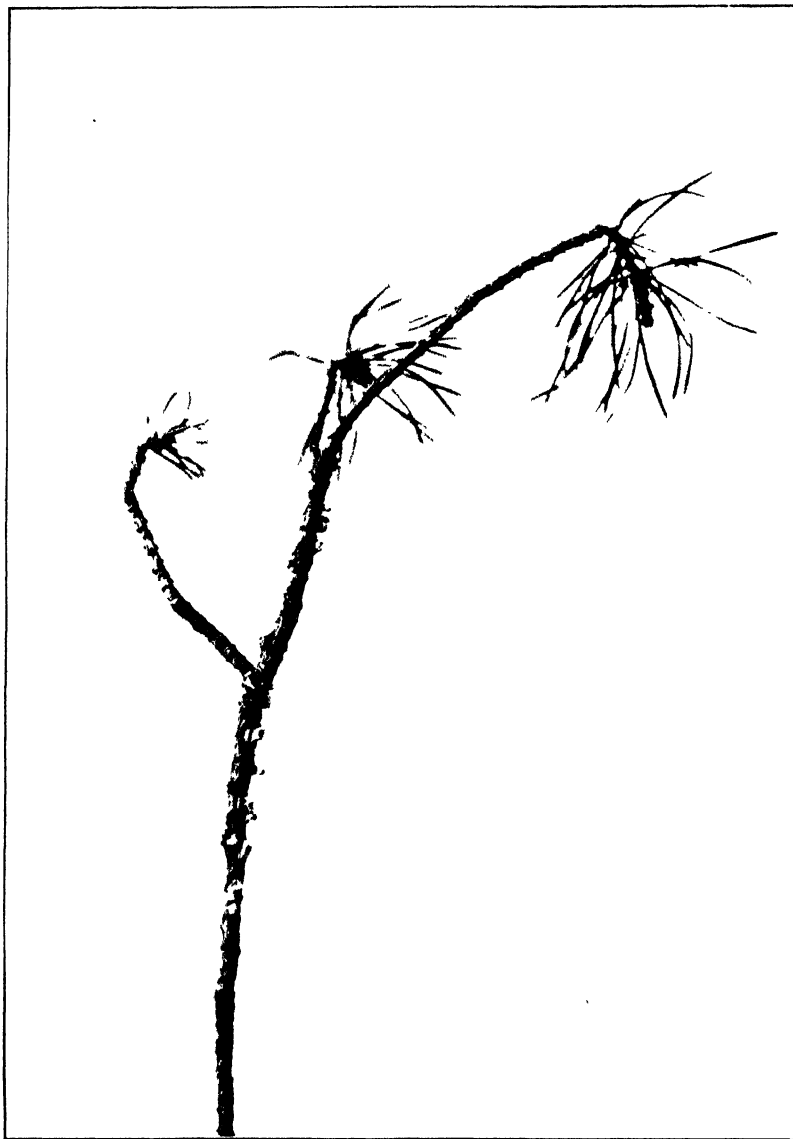


Fig. 2.—Twig of Scots Pine showing the bladder-like fructifications of the fungus.

From experimental culture and infection experiments, it is now known that the form *acicola* includes a dozen or more distinct species, the "bladder" (*æcidium*) stages of which occur on coniferous needles, the other forms of spores (uredospores and teleutospores) being produced on a variety of plants such as Ragweed, Sow-thistle, etc. These rusts are now included in the genus *Coleosporium*.

Of the form *corticola* four distinct species are known, and two of them occur on the Scots Pine. One of these completes its life history by producing its uredo and teleutospores on a variety of plants such as *Vincetoxicum*, *Paeonia*, *Nemesia*, *Asclepias*, etc. These plants, however, do not occur naturally in Ireland, and it is unlikely that the rust responsible for the disease at Cappagh can be this one which is now known as *Cronartium asclepiadeum*.

The second species of the form *corticola* which occurs on Scots Pine has been the subject of very extended experimental investigations. Infection trials with the spores of this bladder-rust have been made upon over one hundred different species of plants, but until lately without any success as regards the discovery of a second host plant. Three or four years ago, however, Dr. Liro, in Finland, expressed the opinion that a rust which he found on the leaves of certain species of Lousewort (*Pedicularis palustris* and *P. sceptrum carolinum*) and which was formerly known under the name of *Uredo Pedicularis* Diebr. was the long-looked-for secondary stage in the life history of the bladder-rust in question, *Peridermium Pini* (Willd.) Kleb. Infection experiments carried out a little later on proved the correctness of this view, for it was found that if the bladder-rust spores were sown on the leaves of the Louseworts, the uredo-form of rust was produced on them. Hence the scientific name of this rust has now been altered to *Cronartium Peridermium-Pini* (Willd.) Liro, and it is probably this species which occurs at Cappagh. Up to the present, however, success has not attended the efforts to produce the bladder-rust on the Scots Pine by sowings of the spores from the Lousewort, doubtless owing to the exact conditions for infection not having been realised in the trials made so far.

Two species of Lousewort are common in Ireland, namely, *Pedicularis palustris* (sometimes called the "Red Rattle") and *P. sylvatica*, the common Lousewort. The former grows in damp, marshy, or boggy situations, and the latter on drier bogs or more frequently on heaths. Neither of these plants was actually observed at the time the visit to the woods was made, but the common Lousewort is probably plentiful on the hillsides above the woods, and the Red Rattle would probably be found if a search were made for it in the neighbourhood. It is hoped on a future occasion to make a search for these two plants, and to ascertain whether the rust mentioned above exists upon them in this locality. If it is to be found on them

it would furnish circumstantial evidence of the correctness of Dr. Liro's view, and the extermination of these plants might prevent fresh trees from becoming attacked, but the carrying out of such a process of extermination would, of course, be practically impossible, and this could not seriously be suggested as a means of prevention of further trouble.

GEO. H. PETHYBRIDGE.

THE WARBLE FLY.

The damage done by warble-maggots that live in the backs of cattle is well known to farmers and to all traders in live-stock. The flesh of bullocks and the milk-producing power of cows suffer injury through their presence, and great loss results from the fact that warbled hides, being pierced with holes, are largely useless for tanning. Further, if the weather during July and August is hot and dry, cattle do not thrive owing to the annoyance caused by warble flies; consequently they do not increase in weight, and farmers suffer serious loss. This loss is preventable.

HISTORY OF THE FLY AND MAGGOTS.

The maggots are the offspring of Warble Flies, of which there are two kinds in Ireland, very much alike in appearance and habits. These flies resemble bumble-bees, being clothed with black, white, and yellow or orange hairs. They fly in the bright sunshine, with a feeble hum. They can neither bite, sting, nor pierce the cattle in any way. Yet when, in order to lay their eggs, they approach grazing animals, these become greatly alarmed and often rush wildly about to the injury of their health. The fly-season lasts from the beginning of June until the end of August. The female fly is believed to lay her eggs mostly on the legs and feet of the cattle, rarely on the back and sides. Yearling bullocks and heifers suffer most of all cattle from the attacks of the flies. Young calves are also very subject to annoyance, but milch cows are attacked far less frequently than younger animals.

We do not yet know exactly what happens in connection with the hatching of the eggs nor how the young maggot enters the body of the cow or calf. The young maggot may be licked into the beast's mouth, or it may bore its way through the skin. During late summer and autumn young maggots are found in the wall of the gullet; later on they are to be found wandering through the tissues. In January and February they arrive beneath the skin of the back, where their presence gives rise to the familiar round tumours or "warbles." Later the skin is pierced from within so that the maggot may obtain a supply of air. By March some of the maggots are "ripe" or fully grown, about an inch in length, brownish and barrel-shaped. During the spring months—from March till May, or even into June—the ripe maggots work their way out of the backs of the animals, fall to the ground, and, during a resting-stage of six or seven weeks' duration, slowly develop into the flies of the next summer.

PRACTICAL MEASURES.

Experiments show that no reliance can be placed on the various dips and smears that have been recommended for use in summer

to prevent egg-laying by the flies. Warble Flies are active only in bright sunshine and appear to dislike water. Cattle can therefore obtain relief if they have access to the shade of trees and to a stream or pond.

On the other hand great benefit results from systematic destruction of the maggots in spring, while they are all in the backs of the cattle where they can readily be got at. For if no maggots be allowed to complete their transformation, there will be no flies in the summer to lay eggs whence fresh maggots can arise. The farmer should, therefore, kill maggots and persuade his neighbours to do the same.

1. *Smearing*.—The backs of the cattle are smeared with some sticky substance which fills up the air-holes, and chokes and kills the maggots. Many of the substances commonly recommended for this purpose are doubtfully useful, but a smear compounded of equal parts of Archangel tar and paraffin oil, very carefully mixed, has been found effectually to kill the maggots. This smear must be rubbed freely over all the area of the back where warbles are present, so that every hole gets choked with it. The maggots become shrivelled up, and are finally worked out of the holes, the skin afterwards healing.

• 2. *Squeezing-out*.—The most certain method of killing the maggots is to apply pressure around the swelling, and thus squeeze the insect out, after which it can be crushed. With practice, men become expert in this operation and the backs of the cattle are quickly cleared of the parasites. Squeezing out maggots is more easily done in wet than in dry weather, and a hard-skinned beast can be made more pliable by preliminary washing with salt solution— $\frac{1}{2}$ lb. salt to 3 gallons of water. The skin heals quickly after the operation; when several maggots have been removed from a small area, a light dub of antiseptic dressing is advisable.

Maggot destruction by either of these two methods should be done thoroughly at least twice in the season, about the middle of April and at the end of May, every beast being carefully examined and cleared of all ripe warble-grubs. It is advisable also to have a preliminary dressing or squeezing in March and a final clearance about the middle of June. Such systematic destruction, carried on for a few years throughout the country, may confidently be expected to exterminate the insects.

Copies of this article in revised leaflet form (No. 1) may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin. Letters of application so addressed need not be stamped.

WINTER EGG RECORDS.

In the issue of the JOURNAL, Vol. IX., No. 4, an article appeared dealing with Winter Egg Records and giving a number of records for the period October, 1908—March, 1909. A further article in the JOURNAL, Vol. X., No. 3, set forth the results for the six months October, 1909—March, 1910. Some records for last winter—October, 1910—March, 1911—are given below. The results for the three winter seasons are shown in the following table:—

Breeds.	October, 1908, to March, 1909.	October, 1909, to March, 1910.	October, 1910, to March, 1911.
White Leghorns, . . .	44·3	39·7	41·5
Brown Leghorns, . . .	40·7	42·1	37·9
Black Minorcas, . . .	32·8	38·0	48·3
Buff Orpingtons, . . .	54·5	42·4	45·2
White Orpingtons, . . .	50·7	48·7	54·1
White Wyandottes, . . .	56·6	34·2	45·2
Faverolles, . . .	42·5	41·5	35·7
Barred Plymouth Rocks, . . .	35·9	39·2	45·5
Houdans, . . .	59·2	58·5	62·5
Sussex, . . .	31·6	32·1	39·8
Andalusians, . . .	—	71·3	—
Rhode Island Reds, . . .	—	—	63·9
Mixed Pure Breeds, . . .	39·7	—	—
Mixed Flocks, . . .	40·8	41·9	40·5
General Averages, . . .	42·3	40·7	42·7

Apart from the improvement shown by Black Minorcas, the decline shown by Faverolles, and the excellent records shown by the single flocks of Houdans and Rhode Island Reds, the notable feature of last winter's records is the comparative uniformity in result shown by the principal breeds. Thus, omitting breeds of which the returns relate to less than 100 birds, we have the following figures:—

White Leghorns,	41·5
Black Minorcas,	48·3
Buff Orpingtons,	45·2
White Wyandottes,	45·2
Faverolles,	35·7
Barred Plymouth Rocks,	45·5
Sussex,	39·8
Mixed Flocks,	40·5

Whilst the general results of the various breeds are so uniform, the great variations in results due to strain, which

Importance of Strain. have been continually pointed out in the articles relating to Egg Records, still show themselves as markedly as ever, as will be seen from the

following table:—

Breed.	Average of all the flocks.	Average of best flock.	Average of worst flock.
White Leghorns, . . .	41.5	51.5	25.9
Black Minorcas, . . .	48.3	88.2	20.2
Buff Orpingtons, . . .	45.2	57.9	16.2
White Wyandottes, . . .	45.2	55.4	25.1
Faverolles,	35.7	49.4	23.9
Barred Plymouth Rocks, . .	45.5	53.5	39.3
Sussex,	39.8	66.4	29.9
Mixed Flocks,	40.5	96.2	17.8

The importance of strain is thus again brought out.

EGG-RECORDS.—WINTER, 1910-11.

SUMMARY TABLE.

Name of Breed.	October.		November.		December.		January.		February.		March.		Total of Monthly Averages.
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
White Leghorns, . . .	276	3.3	284	2.7	296	3.2	423	6.0	406	9.6	426	10.7	41.5
Brown Leghorns, . . .	50	2.3	50	1.0	52	1.5	82	5.6	80	11.1	81	16.4	37.9
Minorcas,	135	4.4	140	3.7	114	4.4	248	7.6	183	10.8	155	17.4	48.3
Buff Orpingtons, . . .	77	4.2	86	3.2	146	3.5	207	8.8	207	10.6	205	14.9	45.2
White Wyandottes, . . .	51	7.8	49	8.1	99	4.7	144	8.5	134	10.5	133	14.5	54.1
Faverolles,	316	3.6	348	2.7	392	5.4	721	7.6	639	10.5	712	15.4	45.2
Plymouth Rocks, . . .	282	2.0	287	1.1	339	2.7	379	4.9	376	9.3	347	15.7	35.7
Houdans,	258	5.5	226	4.7	337	4.4	463	6.7	457	8.8	462	15.4	45.5
Sussex,	25	6.6	24	4.5	20	6.3	25	9.4	25	12.3	20	23.4	62.5
Rhode Island Reds, . .	81	5.0	116	2.0	162	4.8	246	5.3	220	8.9	238	13.8	39.8
Mixed Flocks,	10	2.0	10	5.7	10	13.9	10	9.8	10	10.0	10	22.5	63.9
Totals,	1,683	5.0	1,774	2.8	1,716	3.1	1,761	5.6	1,771	9.6	1,711	14.4	40.5
Totals,	3,224	4.6	3,394	2.9	3,683	3.9	4,709	6.3	4,508	9.7	4,500	15.3	42.7

WHITE LEGHORNS.

Number	October.		November.		December.		January.		February.		March.		Total of Monthly Averages.
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
1	21	4.7	21	3.4	21	3.4	21	5.6	22	9.7	21	19.6	46.4
2	30	0.0	30	4.6	30	8.3	30	11.5	30	11.3	30	14.4	50.1
3	30	1.0	40	0.0	40	0.0	33	5.5	30	5.7	32	13.7	25.5
4	18	1.1	18	0.0	20	1.0	25	1.0	20	9.6	24	18.0	28.7
5	24	7.8	24	3.3	41	4.7	42	6.0	42	10.6	40	18.6	51.0
6	30	7.0	30	5.0	30	5.2	30	7.3	35	9.2	33	17.8	51.5
7	30	0.4	30	0.3	30	1.3	30	4.0	30	8.0	30	16.6	30.6
8	32	0.8	33	0.6	33	0.7	33	2.3	32	5.3	33	21.0	30.7
9	30	0.0	30	0.1	30	1.5	30	2.3	30	8.8	30	13.6	26.3
10	31	10.7	28	10.5	-	-	-	-	-	-	-	-	-
11	-	-	-	-	21	7.7	24	6.0	24	6.5	23	14.6	-
12	-	-	-	-	-	-	30	4.6	30	11.6	30	13.9	-
13	-	-	-	-	-	-	40	9.6	40	12.5	40	14.3	-
14	-	-	-	-	-	-	30	12.7	30	14.7	30	21.4	-
15	-	-	-	-	-	-	25	3.2	30	9.8	30	18.0	-
Totals,	276	3.3	284	2.7	296	3.2	423	6.0	406	9.6	426	10.7	41.5

BROWN LEGHORNS.

1	20	1.0	20	0.0	22	0.6	23	3.4	23	9.0	22	12.5	26.5
2	30	3.2	30	1.7	30	2.1	30	4.4	28	8.0	30	15.9	35.3
3	-	-	-	-	-	-	29	8.7	29	16.0	29	20.0	-
Totals,	50	2.3	50	1.0	52	1.5	82	5.6	80	11.1	81	16.4	37.9

MINORCAS.

1	45	9.0	55	6.6	45	10.9	40	16.0	35	19.4	35	26.3	88.2
2	30	2.3	30	0.0	30	0.2	30	1.3	30	8.3	30	15.2	27.3
3	30	0.0	25	0.4	25	0.4	32	2.3	33	6.2	35	10.9	20.2
4	30	4.3	30	4.7	-	-	-	-	-	-	-	-	-
5	-	-	-	-	14	0.0	14	2.6	14	6.4	14	14.1	-
6	-	-	-	-	-	-	30	2.3	30	7.3	30	16.8	-
7	-	-	-	-	-	-	30	8.8	30	11.1	-	-	-
8	-	-	-	-	-	-	61	9.2	-	-	-	-	-
9	-	-	-	-	-	-	4	4.2	4	9.8	4	9.5	-
10	-	-	-	-	-	-	7	26.0	7	23.6	7	28.3	-
Totals,	135	4.4	140	3.7	114	4.4	248	7.6	183	10.8	155	17.4	48.3

BUFF ORPINGTONS.

Number.	October.		November.		December.		January.		February.		March.		Total of Monthly Averages.
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
1	27	2.2	28	3.0	26	8.3	26	6.9	26	6.6	25	9.2	36.2
2	8	3.0	8	1.9	8	0.0	8	0.0	8	2.5	8	8.8	16.2
3	22	9.0	30	5.4	30	3.2	30	10.3	30	13.5	30	16.5	57.9
4	20	2.0	20	0.9	30	3.0	31	2.5	30	10.2	30	14.5	33.1
5	-	-	-	-	35	0.0	35	8.1	35	10.0	35	12.4	-
6	-	-	-	-	17	6.2	15	10.5	16	8.1	15	13.7	-
7	-	-	-	-	-	-	29	9.7	30	11.4	30	18.2	-
8	-	-	-	-	-	-	33	7.9	32	14.0	32	20.0	-
Totals,	77	4.2	86	3.2	146	3.5	207	8.8	207	10.6	205	14.9	45.2

WHITE ORPINGTONS.

1	25	6.2	25	8.3	25	4.6	25	8.1	25	11.4	25	14.9	53.5
2	26	9.2	24	7.2	30	4.7	34	8.7	34	10.5	34	12.3	52.6
3	-	-	-	-	-	-	10	5.9	-	-	-	-	-
4	-	-	-	-	8	6.3	9	12.0	9	14.7	8	13.0	-
5	-	-	-	-	-	-	30	10.4	30	10.9	30	13.5	-
6	-	-	-	-	30	2.0	30	6.0	30	7.8	30	15.6	-
7	-	-	-	-	6	16.5	6	11.2	6	11.3	6	18.3	-
Totals,	51	7.8	49	8.1	99	4.7	144	8.5	134	10.5	133	14.5	54.1

WHITE WYANDOTTES.

1	34	2.8	32	2.4	32	3.9	31	9.0	31	10.3	31	13.2	41.6
2	40	1.5	32	1.5	32	1.7	34	3.5	34	5.5	34	11.4	25.1
3	32	0.4	32	0.2	32	2.6	32	4.9	32	8.3	29	11.9	28.3
4	24	2.4	25	2.0	28	5.2	30	6.0	29	6.9	27	12.9	35.4
5	36	8.1	36	5.4	30	5.3	32	7.7	32	10.9	32	14.2	51.6
6	40	8.0	48	8.5	48	7.8	52	8.5	60	10.2	60	12.4	55.4
7	25	1.7	23	1.2	24	6.1	23	9.0	23	8.8	21	11.6	38.4
8	39	1.2	39	0.6	30	5.2	30	8.4	-	-	30	19.5	-
9	8	0.0	8	2.6	8	8.1	8	5.0	8	12.4	8	21.5	49.6
10	12	5.7	12	3.5	24	3.5	24	7.3	25	9.0	25	14.5	43.5
11	26	5.0	26	0.0	-	-	-	-	-	-	23	8.5	-
12	-	-	-	-	30	3.7	30	7.3	30	12.8	30	14.8	-
13	-	-	35	1.6	38	4.9	28	4.5	28	7.1	26	11.7	-
14	-	-	-	-	6	10.5	7	9.1	7	11.6	8	14.5	-
15	-	-	-	-	-	-	29	1.7	29	7.3	30	16.9	-
16	-	-	-	-	-	-	30	9.9	30	10.2	30	17.3	-
17	-	-	-	-	30	8.1	30	8.1	-	-	30	11.7	-
18	-	-	-	-	-	-	23	12.3	22	6.6	-	-	-
19	-	-	-	-	-	-	30	8.7	30	11.6	30	13.5	-
20	-	-	-	-	-	-	10	1.0	10	6.8	10	9.9	-
21	-	-	-	-	-	-	24	7.0	30	8.7	30	14.8	-
22	-	-	-	-	-	-	30	9.0	30	14.5	30	15.3	-
23	-	-	-	-	-	-	14	23.6	21	21.9	58	22.0	-
24	-	-	-	-	-	-	33	9.3	33	12.0	31	16.1	-
25	-	-	-	-	-	-	6	2.5	-	-	-	-	-
26	-	-	-	-	-	-	46	1.8	8	10.0	9	15.7	-
27	-	-	-	-	-	-	22	12.0	24	15.5	7	22.7	-
28	-	-	-	-	-	-	33	12.0	33	14.4	33	28.1	-
Totals,	316	3.6	348	2.7	392	5.4	721	7.6	639	10.5	712	15.4	45.2

FAVEROLLES.

Number	October.		November.		December.		January.		February.		March.		Total of Monthly Averages.
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
1	30	6.5	30	4.1	30	6.2	30	7.0	30	11.1	30	13.7	48.6
2	20	8.4	20	4.4	20	2.9	20	4.2	22	10.3	20	19.2	49.4
3	30	3.6	30	2.4	30	2.7	23	4.3	20	8.8	18	16.4	38.2
4	24	2.3	24	0.8	25	0.5	24	1.5	24	3.9	12	14.9	23.9
5	-	-	-	-	32	3.9	30	10.1	30	14.2	30	14.9	-
6	31	0.0	31	0.4	34	1.0	35	4.4	35	12.7	30	17.6	36.1
7	40	0.0	40	0.0	40	4.9	40	9.3	38	9.7	31	17.3	41.2
8	48	0.0	45	0.0	45	1.8	46	3.0	46	7.4	46	12.7	24.9
9	24	0.7	24	0.0	23	0.0	21	5.3	21	11.8	19	19.9	37.7
10	3	6.0	3	0.0	8	7.0	8	5.0	8	8.1	8	15.6	41.7
11	9	2.0	10	0.8	22	1.0	20	7.1	20	8.0	20	17.2	36.1
12	30	0.0	30	0.0	30	2.8	30	2.7	30	8.4	30	15.8	29.7
13	-	-	-	-	-	-	40	1.3	40	5.9	40	14.1	-
14	-	-	-	-	-	-	12	0.6	12	9.4	10	13.1	-
Totals,	282	2.0	287	1.1	339	2.7	379	4.9	376	9.3	347	15.7	35.7

PLYMOUTH ROCKS

1	10	4.6	10	1.2	12	0.5	12	6.7	-	-	12	11.4	-
2	42	6.6	40	7.0	40	2.9	40	4.2	40	7.4	40	18.8	46.3
3	6	1.7	6	4.3	6	4.5	6	0.0	6	11.5	6	20.7	42.7
4	19	6.5	19	4.0	33	3.8	33	8.3	33	11.3	33	18.0	51.9
5	25	2.0	25	1.0	30	5.7	30	7.3	30	9.6	30	13.7	39.3
6	40	1.0	40	1.4	42	4.7	40	12.4	42	10.4	40	14.0	43.9
7	20	2.5	20	3.6	10	9.6	15	8.2	18	7.0	19	10.3	41.2
8	66	11.7	66	7.9	66	3.4	86	5.4	86	8.1	86	17.0	53.5
9	-	-	-	-	30	1.6	30	3.1	31	4.0	30	11.0	-
10	30	2.3	-	-	-	-	30	3.5	30	9.7	26	19.4	-
11	-	-	-	-	28	3.8	26	5.7	26	8.5	25	14.4	-
12	-	-	-	-	-	-	16	6.4	16	3.4	16	14.8	-
13	-	-	-	-	-	-	25	5.7	25	12.6	25	17.2	-
14	-	-	-	-	-	-	34	8.0	34	6.9	34	11.5	-
15	-	-	-	-	40	9.8	40	10.3	40	12.6	40	15.0	-
Totals,	258	5.5	226	4.7	337	4.4	463	6.7	457	8.8	462	15.4	45.5

HOUDANS.

1	25	6.6	24	4.5	20	6.3	25	9.4	25	12.3	20	23.4	62.5
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RHODE ISLAND RED.

1	10	2.0	10	5.7	10	13.9	10	9.8	10	10.0	10	22.5	63.9
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SUSSEX.

Number	October.		November.		December.		January.		February.		March.		Total of Monthly Averages.
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
1	20	3.1	20	2.5	20	0.9	20	6.8	-	-	20	16.4	-
2	12	4.7	30	0.3	30	0.0	30	4.0	30	8.5	30	13.8	-
3	21	0.8	18	0.4	16	5.7	17	3.8	18	9.4	17	9.8	29.9
4	8	9.9	8	9.0	8	7.0	8	2.6	8	8.8	8	10.4	47.7
5	30	3.7	30	0.5	41	2.2	41	5.6	41	4.3	41	13.8	-
6	-	-	-	-	38	10.0	40	10.0	40	10.7	39	15.6	-
7	-	-	-	-	-	-	18	1.1	11	5.0	11	13.5	-
8	10	8.3	10	7.4	10	16.0	10	8.1	10	10.1	10	16.5	66.4
9	-	-	-	-	-	-	29	6.2	29	7.3	29	13.7	-
10	-	-	-	-	-	-	33	1.9	33	8.0	33	12.2	-
Totals,	81	5.0	116	2.0	162	4.8	246	5.3	220	8.9	238	13.8	39.8

MIXED BREEDS.

1	31	0.5	31	0.5	33	4.7	26	10.9	26	13.6	26	14.8	45.0
2	48	3.2	48	0.0	52	0.8	52	2.3	52	4.9	41	12.2	23.4
3	20	0.0	20	0.2	24	0.5	25	0.8	25	5.4	20	10.9	17.8
4	80	1.7	80	0.1	60	0.4	60	1.0	-	-	-	-	-
5	39	8.7	35	0.0	46	7.3	55	11.4	60	13.1	60	16.6	63.1
6	70	6.8	56	1.7	60	3.0	60	5.9	60	15.5	60	17.3	50.2
7	48	3.5	48	4.6	48	3.9	60	1.8	60	6.6	60	11.0	31.4
8	41	5.6	44	4.9	40	1.0	40	1.2	42	13.5	42	13.2	39.4
9	24	10.3	24	1.8	24	0.2	40	0.1	40	0.4	20	12.6	25.4
10	6	8.0	6	2.5	6	6.5	16	5.3	15	6.8	12	18.9	48.0
11	50	4.2	50	2.6	40	4.8	50	7.3	60	6.9	50	18.6	44.4
12	64	6.7	75	2.9	65	2.9	64	5.3	65	8.9	65	14.5	41.2
13	45	3.4	45	1.4	45	1.1	45	7.0	45	16.1	60	12.6	41.6
14	35	11.3	75	3.6	63	4.5	68	10.2	64	13.0	61	18.3	60.9
15	30	11.9	50	3.4	70	0.1	60	1.9	60	4.9	60	13.1	35.3
16	23	12.0	32	3.4	32	3.9	34	8.3	32	12.8	33	18.1	58.5
17	45	1.2	40	1.0	40	1.0	44	1.5	42	4.4	40	10.9	20.0
18	35	10.0	35	7.9	35	0.0	35	0.0	40	10.0	40	15.3	44.1
19	55	4.6	55	4.4	55	4.2	55	8.5	40	11.5	40	14.4	47.6
20	35	8.4	35	0.0	35	0.0	38	3.2	40	7.3	40	14.5	33.4
21	72	8.9	72	7.7	24	16.0	18	20.0	18	20.3	18	23.3	96.2
22	30	8.7	33	3.3	30	0.6	35	3.7	38	9.1	37	12.5	37.9
23	20	2.5	20	0.9	20	5.8	31	9.1	30	13.0	29	16.4	47.7
24	38	5.3	37	2.5	40	2.1	41	5.1	46	10.5	50	15.3	40.8
25	25	0.0	40	4.5	40	0.0	40	3.4	40	7.3	40	11.0	26.2
26	110	9.9	110	4.1	110	4.5	110	6.8	110	9.9	110	10.0	46.2
27	36	1.0	36	1.2	36	9.1	36	14.5	36	13.7	36	13.5	53.0
28	37	4.1	55	3.3	51	2.9	53	1.6	52	5.8	50	11.7	27.4
29	26	1.0	26	1.9	26	0.0	28	5.0	28	5.8	21	13.5	27.2
30	80	1.5	92	0.8	81	1.6	46	7.0	74	9.0	74	12.5	32.4
31	52	1.0	52	2.1	52	6.0	56	8.0	52	10.2	45	14.8	42.1
32	47	0.0	47	1.6	47	1.7	47	7.0	47	13.0	45	18.8	42.1
33	35	3.5	35	0.2	35	0.4	35	4.5	60	7.4	60	14.4	30.4
34	39	0.0	39	2.0	45	9.0	45	11.3	45	12.7	45	14.3	49.3
35	70	8.4	70	8.0	70	6.9	78	7.0	78	19.7	79	20.4	22.4

NATIONAL MUSEUM OF SCIENCE AND ART.

[*** *It is intended to publish, at intervals, in the JOURNAL articles dealing with the work done in the National Museum of Science and Art. The second series of articles is appended.*]

I. -NATURAL HISTORY COLLECTIONS.

In the first article on the Natural History Collection¹ allusion was made to a model of a rock-pool which had been set up in the Museum. A short description was given of its structure and inhabitants. The photograph of it has now been taken (Plate I.) for this second article.

The Natural History staff is still largely engaged in classifying and naming the extensive collections made on Clare Island, Co. Mayo, during the past few seasons. The survey of this island, which was briefly alluded to in the first of these papers,² has been undertaken by a committee supplied with funds from the Royal Irish Academy, the Royal Dublin Society, the British Association for the Advancement of Science, and the Royal Society of London. Over fifty observers have taken part in it so far. The original intention was to study the fauna and flora of a western island with that of the nearest part of the mainland, with a view to determining whether the island received its animals and plants when it was part of the mainland, or by what is known as accidental dispersal. A problem of that kind is of considerable interest from many points of view, and its solution may possibly help to explain some phenomena in the geological history of Ireland, which are as yet insufficiently known. In the course of the survey, large collections of animals and plants, terrestrial, fresh-water and marine, have been made, and these form the ground-work of many of the reports which are now being issued on this subject by the Royal Irish Academy.

R. F. S.

IRISH BIRDS.

One of the important advantages resulting from the re-arrangement of the Collections contained in the Lower Room, already referred to, has been the addition of a considerable amount of extra space for the exhibition of the Irish Birds' Collection, which consists of mounted birds, a series of nests and eggs and a number of bird groups.

¹ See *Journal*, Vol. IX., No. 2, p. 343.

² *Ibidem*.

The removal of the Collection to illustrate the Geographical Distribution of Animals from the wall-cases at the Merrion Square entrance has rendered these cases available for the exhibition of the mounted birds, which can now be seen and examined much more satisfactorily than formerly. The birds are arranged systematically according to the "List of Irish Birds, showing the species contained in the National Collection." This list, prepared by Mr. R. J. Ussher, is sold at the entrance to the Museum. The Collection begins with the Thrushes and Warblers in the wall-case facing the visitor on entering by the Merrion Square entrance and ends with the Divers, Grebes, Petrels and Puffins in the wall-case directly opposite and near the exit door.

Examples are exhibited of nearly all the species of birds that are known to have been obtained in Ireland. Only 24 species, whose claims to rank as Irish are generally admitted, are unrepresented.

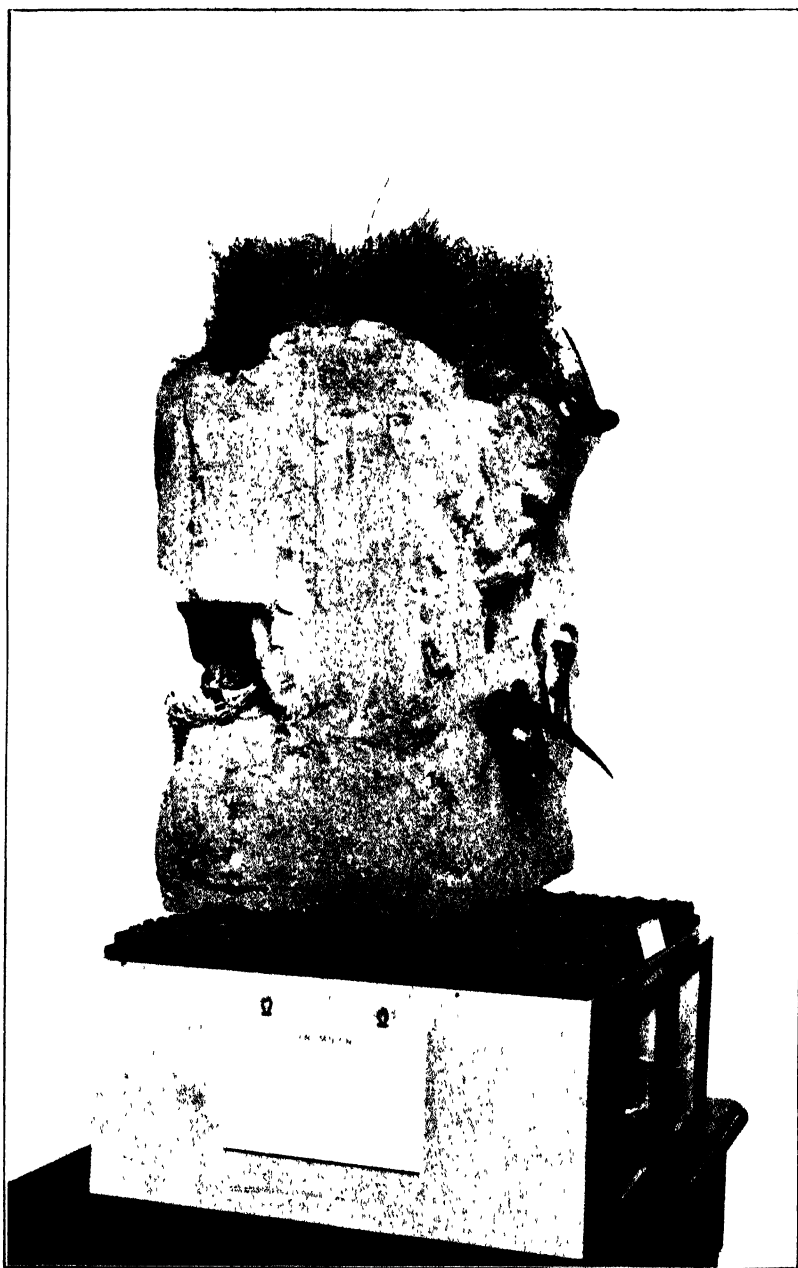
Among recent interesting additions are a Temminck's Stint, an American Blue-winged Teal, and a Roseate Tern. The Temminck's Stint is the only Irish specimen, and was obtained more than sixty years ago. This Stint is easily distinguished from the Common Stint by its smaller size and white outer tail-feather. The immature female Blue-winged Teal was shot, last September, near Ballycotton. This Teal is closely allied to the Garganey, but has the wing-coverts of a vivid lapis-lazuli blue colour instead of bluish-grey, and is an addition to the large number of American birds that have occasionally occurred in Ireland (*Irish Naturalist*, January, 1910). The Roseate Tern, shot on the coast of Connaught, in August, 1904, and mentioned in Mr. Ussher's list as being in the possession of Mr. C. J. Carroll, now forms part of the Museum Collection.

The Collection of nests and eggs has been removed from the lobby at the foot of the stone staircase and is now arranged systematically, in the same order as the mounted birds, in the window cases of the lower room.

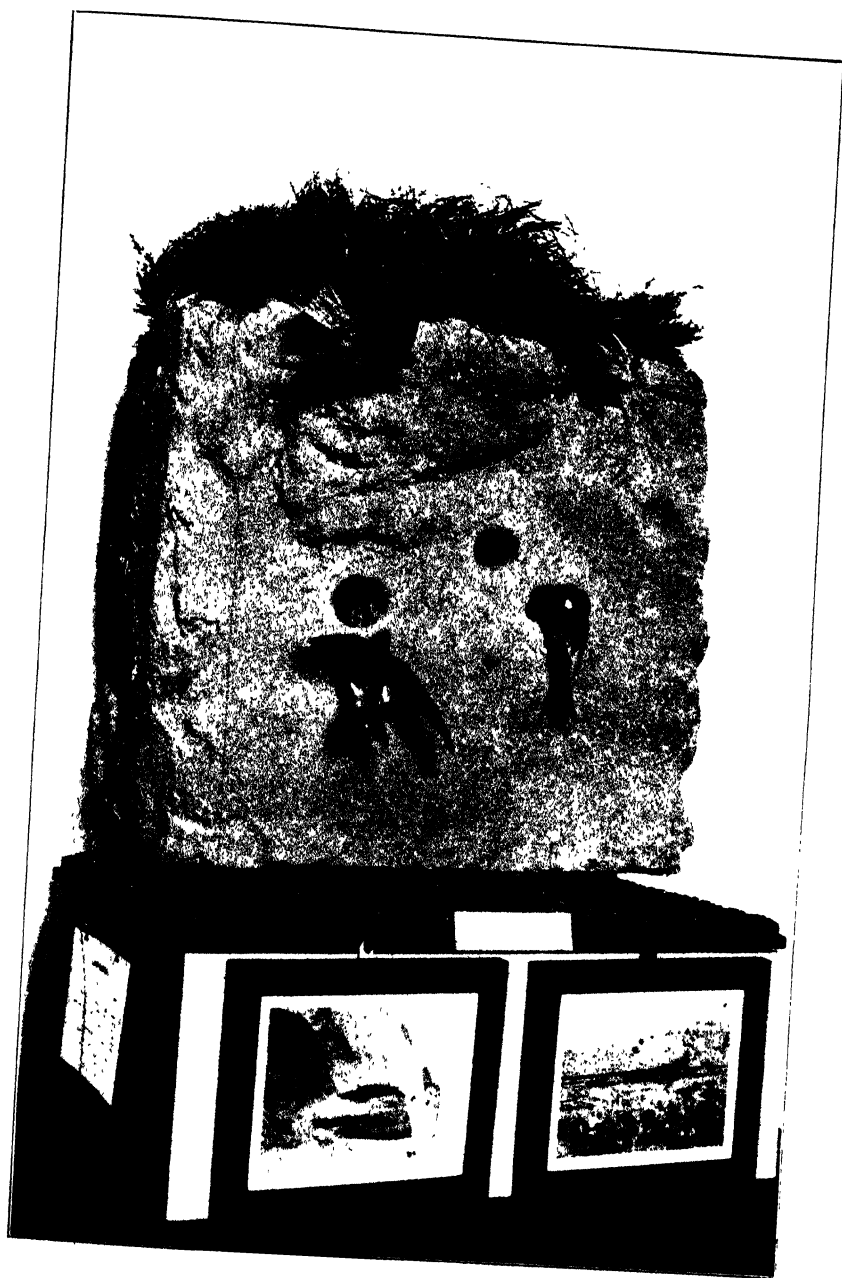
The Irish bird groups, showing some of the more noteworthy Irish birds in their natural surroundings with nests, eggs and young, have been placed in the middle section of the lower room, and are now displayed to much better advantage than before. These groups are to be considered supplementary to the collection exhibited in the wall-cases, and are not arranged in a systematic order. Those birds which are generally regarded as being useful to agriculture by destroying vermin, noxious insects, or injurious weeds, are placed together on one side of the large case—containing Herring Gulls and nests, &c., from Lambay Island—which occupies the exact centre of the room. The groups contain the Kestrel, Lapwing or Peewit, Linnet, Sand-Martin, Blue-Tit, Grey-Wagtail, &c. Photographs and descriptive labels giving the characters and habits of the birds, have been attached to some of the stands supporting the groups, and others are in course of preparation. (See Plates II. and III.)



A Model Rock-Pool.



New Style of Mounting Groups of Irish Birds.
Side view of Sand-Martin Case.



New Style of Mounting Groups of Irish Birds.

Front view of Sand-Martin Case.



Group of Herring Gulls from Lambay Island.

On the other side of the Herring Gull case (Plate IV.) are placed groups of game-birds (Red-Grouse), of birds useful as food and forming objects of sport (Woodcock, Snipe, Golden Plover, &c.), and of a few other birds, such as Terns and Gulls, which, though not known to be of any great economic value, yet add to our pleasure by their beauty and companionship.

A. R. N.

INSECTS.

Among the Study Collections of Insects, which are kept in the Natural History offices, the British Dragonflies, &c. (*Neuroptera*), have been partly revised in order to bring them into line with recent research on the subject. A small series of the different kinds of these interesting insects found in Ireland is contained in the Table Cases at the East end of the Lower Hall. A new list of the Irish species has been prepared by myself, in collaboration with Mr. King of Glasgow, a well-known authority on these flies. The list has been published by the Royal Irish Academy (*Proc. R. I. Acad. Vol. XXVIII. (B.) 1910*).

The *Neuroptera* include a number of insects of extremely varied form, such as the dragon-flies, May-flies and caddis flies, etc. The May-flies are well-known to anglers in the British Isles, and during their "rise," usually in the early summer, they are an important food of the trout, and other fresh-water fishes. The early stages of May-flies are spent in fresh water, where they feed on small organisms. When fully developed, they take to the wing, and immense swarms of some of the species may frequently be observed hovering over the water and, occasionally, depositing their eggs on the surface. As the mouth parts of the fully-grown May-fly are rudimentary, no food is taken. Hence their life in the adult state is very short. More than twenty different kinds of May-flies have been found in Ireland. Probably the best known to anglers are the two large kinds of *Ephemera*. The commonest of these (*E. vulgata*) is the "May-fly" of our lakes and rivers; the other (*E. danica*) chiefly infests the cooler streams. A well-known fishing fly, the "Green Drake," is said to represent an immature form of this latter fly.

The Dragon-flies are poorly represented in Ireland as compared with warmer countries; about twenty-three species have been observed. Some of these are extremely common, such as the small blue and red species, sometimes called "devil's needles," that frequent canals and ponds, while other kinds are rare and local.

The Caddis-flies (*Trichoptera*) are familiar on account of the curious cases constructed by their soft-bodied grubs as a protection against enemies. Abundant in temperate countries, they are often used by anglers as a bait for fresh-water fish.

J. N. H.

II.—BOTANICAL COLLECTIONS.

PALÆOBOTANICAL COLLECTIONS.

The collection of fossil plants in of the Botanical Division is of considerable interest, as the catalogue prepared by Dr. R. Kidston in 1886 indicates. Since that date the study of fossil plants has been most active and fruitful. One result has been the discovery of a group of plants called the "seed-bearing ferns" or fern-like seed plants (*Pteridospermeæ*). Ten years ago it was commonly thought that coal was composed of the carbonised remains of ferns, club-mosses and horse-tails. Now it is stated that ferns proper scarcely enter into coal-formation. The "ferns" are, in reality, the *Pteridospermeæ*. One of these occurs in the coal-measures of South Ireland, S. Belgium, etc., and is called *Sphenopteris Hoeninghausi*. It is now known to be the sterile state of *Crossothecca*. The Botanical Division possesses two specimens of it, but a more interesting specimen, showing the seed in connection with the parent plant, was found by the writer in the collections of the Irish Geological Survey, and, with the permission of the Director of the Survey (Prof. G. A. J. Cole, F.G.S.), has been described recently in the Scientific Proceedings of the Royal Dublin Society.

T. J.

III.—ART AND INDUSTRIAL COLLECTIONS.

THE COSTUME COLLECTIONS.

The lace, embroidery, textiles, and costume collections, forming a more or less cognate group, were originally installed in one apartment (Room X-F); but with the growth of the collections generally, they have expanded to such an extent as to necessitate their dispersal.

The lace collection was transferred to the Main Gallery some years ago. More recently portion of the costume collection, the nucleus of which consisted mainly of ecclesiastical vestments, acquired as examples of artistic embroidery, had to be transferred to the ground floor of the Central Court, and within the past five or six years this collection has developed considerably. It is classified as follows:—ecclesiastical, civil, military and official.

Some ten years ago the ecclesiastical section was temporarily enriched by the magnificent collection of church costume, known as the Waterford Vestments, kindly lent by his Lordship, the Bishop of the Diocese, the Most Reverend Dr. Sheehan. The vestments consisted of four copes, and a High Mass set, chasuble, dalmatic, and tunicle, together with stoles and maniples. The material of the vestments is crimson and green Genoese velvet, and the orphreys and the hoods of the copes are finely embroidered with Biblical subjects in the Flemish style of the first quarter of the sixteenth century.



A seed-bearing Pteridosperm.

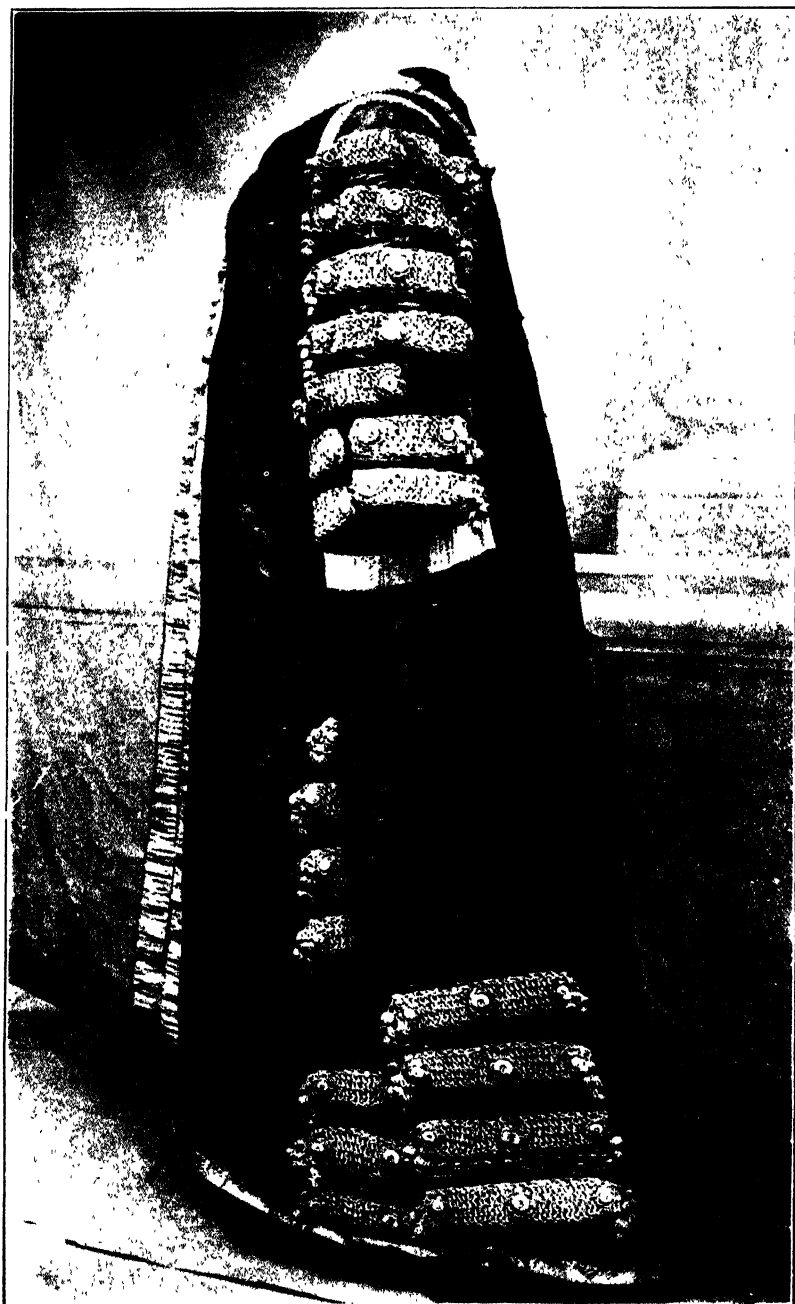


Chasuble. Italian, XVII. Century.
(150—1883).



Flag of the Ballynahinch Volunteers, 1779.

(383—1909).



Official Robe worn by Rt. Hon. John Foster, Speaker of the Irish House of Commons.

(157—1908).

In the permanent collection are some pieces which are excellent examples of coloured embroidery, notably an Italian chasuble of the seventeenth century. (See Plate VI.)

The civil costume, male and female, includes some interesting suits. It has recently been augmented through the kindness of Mr. Talbot Hughes, a London gentleman, who has lent a series of ladies' and gentlemen's costumes belonging to the period extending from the early eighteenth century to the early nineteenth.

The outstanding feature of the military costume is a number of relics of the Irish Volunteers, mostly tunics and beltplates. Exhibited with these is a painted silk flag which belonged to the Ballynahinch Volunteers. (Plate VII.) It was given to the Museum by Mr. Robert Bruce Armstrong, of Edinburgh, together with some other relics of the same regiment.

The official costume includes Thomas Davis's "Eighty-two Club" uniform, given by his sister; the uniform worn by John Hogan, the Sculptor, as a member of the Society of Roman Artists, called the "Virtuosi of the Pantheon," lent by the surviving members of his family; and the official robe worn by the Right Hon. John Foster, the last Speaker of the Irish House of Commons. (Plate VIII.)

J. J. B.

ELIZABETHAN FRUIT TRENCHERS.

Among the rarer objects of Tudor times that have come down to us are certain curious tablets of painted wood, commonly known as roundels, owing to their being nearly always circular in form. They are usually made of thin pieces of beech or sycamore wood, varying from five to six inches in diameter. One side is plain, the other is decorated in colours and gold, with flowers and various floral devices, fruits and scroll-work, enclosing mottoes, posies (some in very coarse language), or passages from the scriptures.

The peculiarity of the lettering and spelling of the inscriptions would be almost sufficient to attribute their origin to the late Tudor period, and this view is confirmed by the fact that several of the extant pieces bear contemporary dates. Their ornaments would suggest, at first sight, an earlier period than this, but it is believed to be a survival of similar ornament found on Illuminated MSS. and books of the close of the 15th century.

As to the exact use of these tablets, there is some diversity of opinion. They were probably used (with the plain side uppermost) as dessert plates or trenchers for fruits or sweetmeats, and were reversed at the close of the meal, when the appropriateness of the lines with reference to the character or matrimonial choice of the guest caused "great diversion." The following contemporary references would appear to confirm this twofold use. Puttenham, in his "Art of English Poesie" (1589), says:—"Of short epigrammes called

posies. There be also another like epigrammes that were sent usually for new year's gifts, or to be printed or put upon banketting dishes of sugar plate, or of March paines, and such other dainty meates, as by the curtesie and custume every gest might carry from a common feast home with him, and were made for the nonce; they were called Nenia or Apophoreta, and never contained above one verse, or two at the most, but the shorter the better. We call them posies, and do paint them now-a-dayes upon the back sides of our fruit trenchers of wood. . . ." John Heywood, in 1598, speaks of "a thin trim trencher to serve folke at frute." In Webster's "Northward Ho!" (1603-4), Doll says to Bellamont: "I'll have you make twelve posies for a dozen of cheese trenchers." And in Middleton's "No Wit, no Help like a Woman's" (1657), much conversation is based on their use as a table game. Prof. A. H. Church, however, in his article on these tablets (from "Some Minor Arts as practised in England" by Church and others, 1894), discredits their use as trenchers for the reception of moist fruits and sticky sweetmeats owing to their delicate and fragile nature. He considers it more likely that they were "employed somewhat after the manner of our modern doily or *serviette de dessert*, the napkin, a most important adjunct of dinner in the absence of forks, being perhaps placed upon them."

The National Museum has an interesting set of ten of these roundels. They were transferred to the Museum by the Royal Irish Academy in 1899, having been on loan since 1894, previous to which their history is not known. The set appears complete, although twelve is the usual number of a set. They are of beechwood, 5½ inches in diameter, and 1-16th of an inch thick. They are painted, in the centre, with marigolds, borage, cowslips, sweet peas, acorns, etc., in a circular compartment, the lower segment of which is inscribed with posies or maxims in rhyme. Around is a border bearing passages from the scriptures, intermingled with flowers, and fruits also (such as heartsease, pinks, hops, marigolds, strawberries, pears, pomegranates (?), etc., conventionally treated), and interlaced work on a stippled ground—all enclosed within an outer border of gilt scroll-work, the design being outlined in black. The last roundel has a skull in place of the central floral device. The inscriptions are executed in a fine running hand, with capitals in red. The colours used in the floral ornament are red, green, yellow and white.

Plate IX. and X. show four of the trenchers.

The inscriptions are as follows:—

1. Spare not to speake wher thow artt bentt.

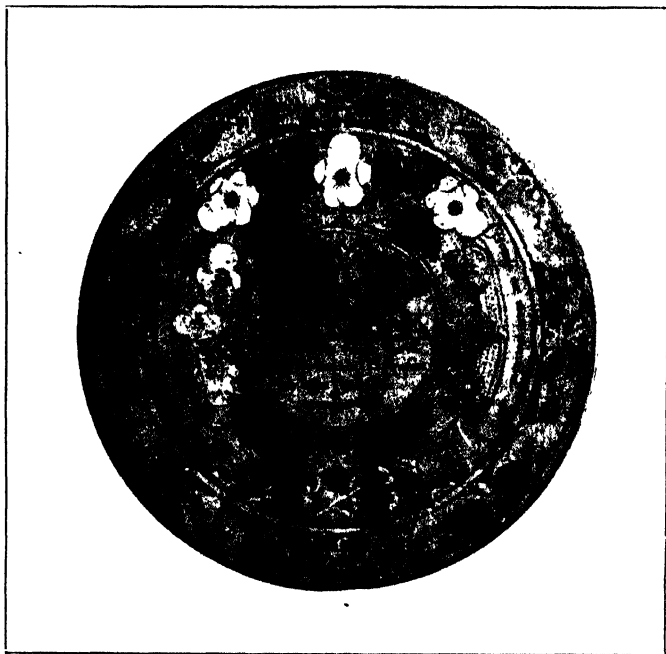
Thou shalte well spedd and not repent.

A righteous man shall lyve by his faithe.—Romans the 10.

Witthe outt faithe itt is onpossible to please God.—Hebrews the 11.



Elizabethan Fruit Trenchers.



Elizabethan Fruit Trenchers.

2. In worldlie wealthe sett not thy mynde.
But seke the lorde thou shalte hym fynde.
Lett us doo good unto all men but moste of all
unto ye housholde of faithe.—Ga. 6.
Reatche ye hande unto ye poore yt God
maie blease ye wth plentuousnes.—Eccl. 7.
3. Thy youthe in follie thou haste spentt.
Defere nott nowe for to repent.
The rote of all evel is covetousnes.—Timo. 6.
Golde and silvr hathe ondon many a man.—Eccl. 8 (?).
4. In Godlie trade ronne well thy race.—Timo.
And from the poore torne not thy face.
Be gétle to heare the worde off God.—Eccl. 5.
Stade faste in the waie off the lorde.—Eccl. 5.
5. In wedlocke twise thou shalte be bounde.
A shrowe att laste shall the confounde.
Followe not ye multetude to evel.—Reg. 17.
Accuse noo man prevelie.—Eccl. 5.
6. Off worldlie goodes thou shalte have store
Be thankful to ye lorde therfore.
A man yt usethe mutche sweringe shal be
fyllede wth wickednes and ye plauge
shall nevr goo from his house.—Eccl. 32.
7. My sonne off pride looke thou beware,
To sarve the lorde sett all thy care.
Feare yu the lorde and the kinge.
Feare God honor ye kinge.—1 Pe. 2.
Kepe the kinge comandement.—Eccl 9.
Praie for kinge and rulers.—Timo 6.
8. Thy foomes mutche greife to the have wroughte
And thy destruction have they soughte.
Have noo pleasure in lyenge
for the use thereof is naghte.—Eccl. 7.
9. Thy hautie mynde dothe cause the smarte
And makes ye sleape withe carefull harte.
Learne before thou speake.—Eccl. 8.
Talke wiselie and honestlie.—Eccl 5.
Speake evel of no man.—Timo. 3.
Be not hastie of thy tounge.—Rom. 5.

10. Truste not this worlde thou woocfull wighte
 But lett thy ende be in thy sighte.
 Deathe is better y^en a wretched lyfe or cotenuall sickness.—
 Eccl. 3.
 Sett an order in yr housse, for
 yu shalte die and not lyve.—Eccl 3.

Biblical quotations similar to the above occur on a set of ten roundels in the South Kensington Museum (No. 6895-1860), with the exception of the passages on the 7th roundel, which are different in each set. The posies in the centre are identical with those on another set (of twelve) given to the same Museum by the Rev. R. Brooke (No. 927-1864).

Between thirty and forty sets of these roundels or trenchers are known to exist, the most interesting of which Prof. Church has described in his paper previously mentioned.

The word roundel is not sufficient to embrace the whole group, as two or three sets are oblong in form.

A few sets still have their original boxes in which they were kept. These are generally turned out of a block of wood, and are painted and gilt.

No foreign roundels have yet been discovered.

The majority of these objects are ascribed to the Elizabethan period, but one set, mentioned by Sir Samuel Meyrick in his catalogue to the "Doucean Museum" at Goodrich Court, belongs to the reign of Henry VIII. It bears the initials of H.K. for Henry and Katherine of Arragon, and, in addition, has the rose and pomegranate, the badges of their respective houses.

The latest known set is dated 1625.

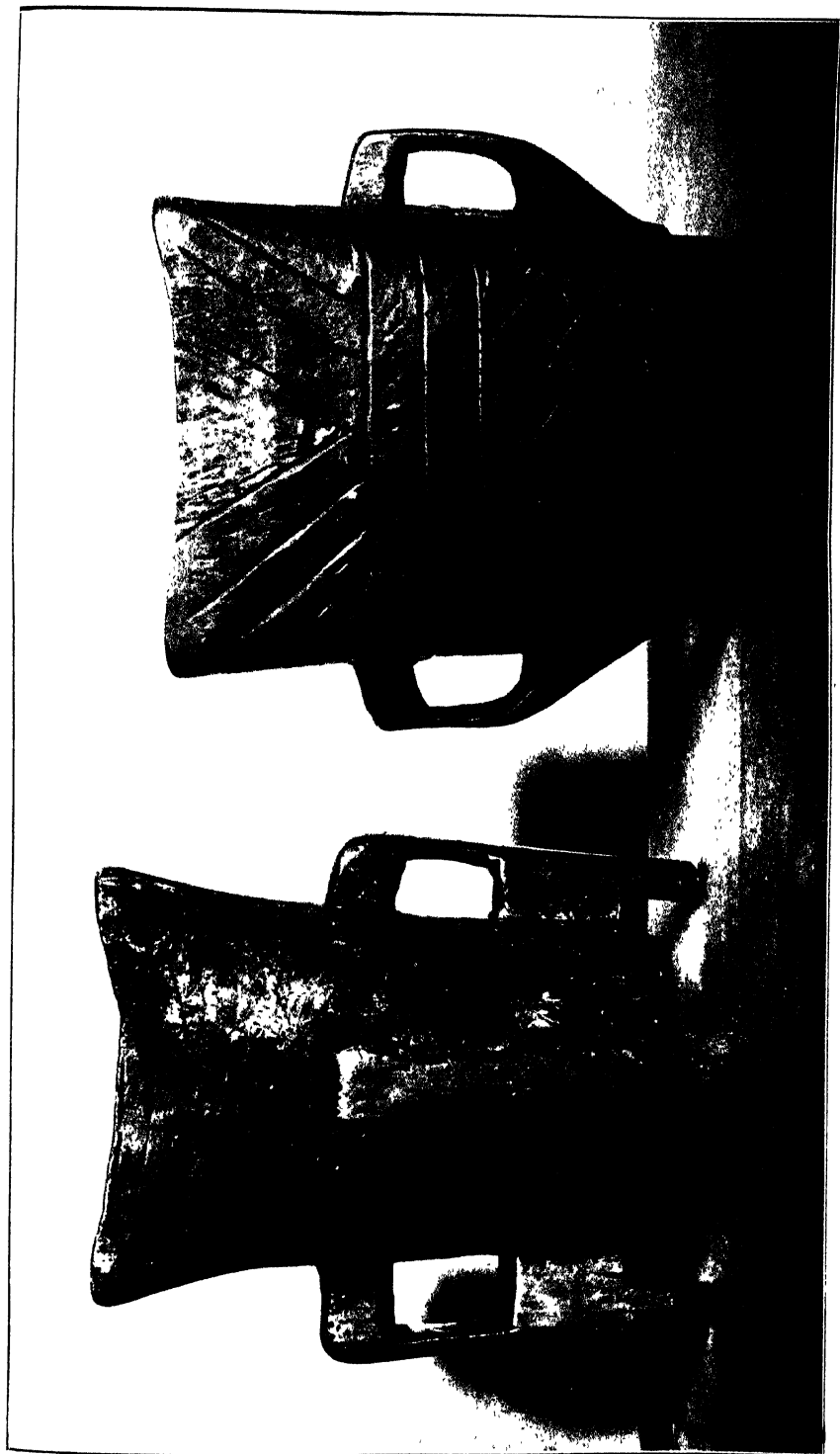
The Museum's set is probably late Elizabethan.

A. J. T.

TWO-HANDLED SILVER CUPS.

Cups with two or sometimes more handles date from early times. Examples with two handles are found among Roman silver of about the first century A.D., while the Irish wooden methers (Plate XI.) are good examples of four-handled drinking vessels. It was not, however, until about the seventeenth century that two-handled silver cups became the fashion in the British Islands. Early in the century two-handled caudle cups and porringers (Plate XII.) appear, the former being often pear-shaped and the latter rather open-mouthed with straight sides slightly turned out at the top. Both usually had covers which were sometimes made so that they could be used also as saucers.

The decoration on the early caudle cups and porringers varied a good deal; at first the cups were generally plain, often with ring

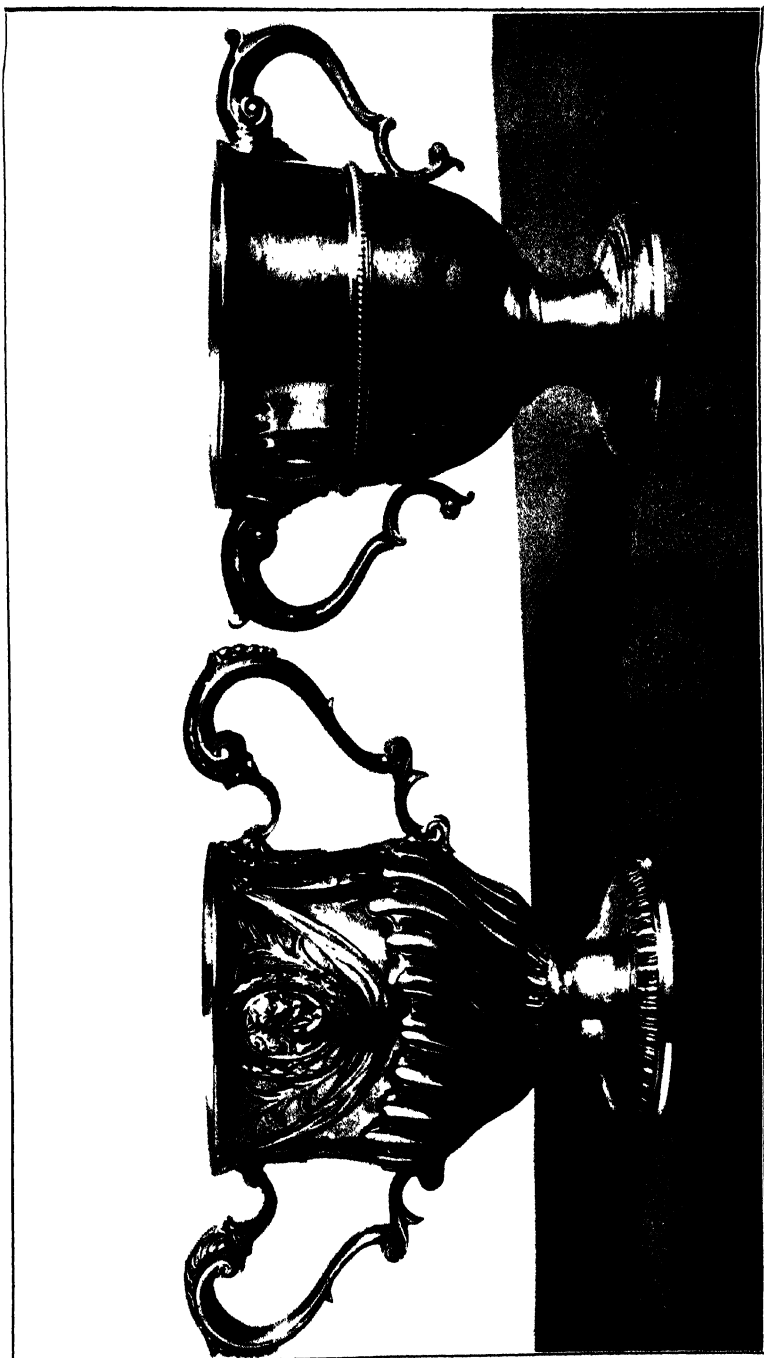


Four-handled and Two-handled Methers.



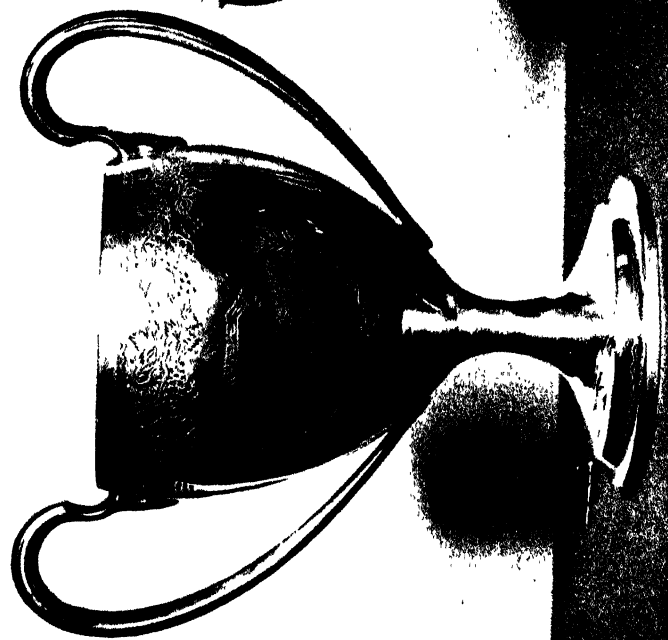
Covered Porringer. London, about 1670.
Museum Loan Collection No. 426.
(The property of Roger Jones, Esq.)

Two-handled Porringer.
London, about 1710.
(60-05).

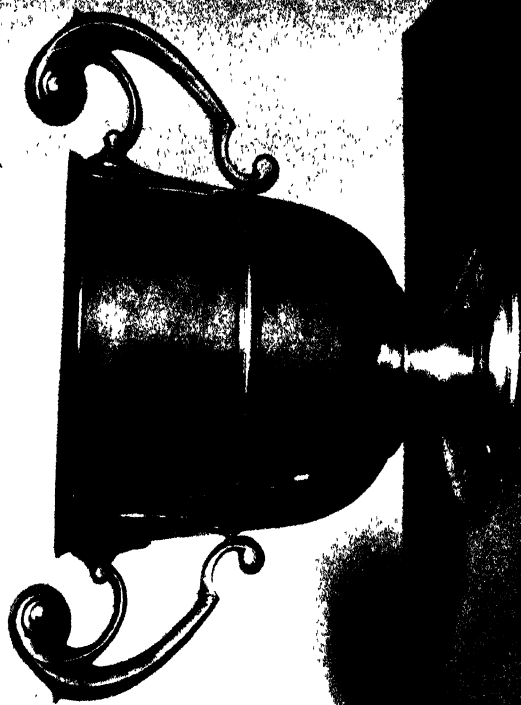


Scroll-handled Cup. Dublin, 1775.
(386-87).

Scroll-handled Cup. Dublin, 1788.
(55-01).



Two-handled Cup. Dublin, 1806.
(77-07).



Harp-handled Cup. Dublin, about 1742.
(40-07).

handles, but during the second half of the seventeenth century, appliqué work, acanthus leaf, and Chinese ornament and tulip decoration were largely employed. Towards the end of the century the porringers, with spiral flutings and punched ornament, appear, and these continued in fashion during the first quarter of the 18th century.

The caudle cups and porringers had usually either narrow rim bases, or else the lower part of the body of the cup was constricted so as to form a low circular base.

Porringers are mentioned in the Assay Books of the Dublin Corporation of Goldsmiths from 1638, and some of the Irish examples of the late seventeenth century are beautiful specimens of the art of the silversmith.

Early in the eighteenth century massive two-handled cups with and without covers and with spreading circular bases were introduced. In Irish cups of this form the earlier specimens usually had rather perpendicular sides and a rounded base to the bowl, the stem and base being rather squat, but as time went on the bowl became more egg-shaped, the stem attenuated and the base higher.

These two-handled cups of the eighteenth century are found plain, repoussé with foliage, scrolls, human figures, and animals; and bright cut with borders, festoons, etc., the handles being generally scroll-shaped.

Some of the Irish repoussé work is of excellent execution, and equal, if not superior, to that of Paul Lamerie and other well-known English silversmiths.

A form of handle peculiar to Irish cups is that known as the " harp " handle, as seen in No. 40-07 (Plate XIV.), and is found on a large number of cups of the first half of the eighteenth century.

The two-handled cups generally had an applied band round the body, and in the earlier examples this is placed in line with the lower junction of the handles with the body. In later cups, however, the band is usually between the upper and lower junction of the handles with the body.

About the third quarter of the century the bowls were often ogre-shaped (Plate XIII.), either plain or decorated with repoussé work or bright cutting.

Towards the end of the century the bowls became very pointed with slightly convex sides and the stems high and narrow (Plate XIV.), and finally these two-handled cups degenerated into the plain goblets without handles.

Immense numbers of two-handled cups of various sizes were made in Ireland in the eighteenth century; Matthew West alone, during the years 1787 and 1788, made nearly five hundred.

M. S. D. W.

SOME RECENT ADDITIONS TO THE ART AND INDUSTRIAL COLLECTIONS.

DONATIONS.

MISS HOGG :

Spanish officer's uniform (tunic, shako, sword-belt, 2 plumes, 2 epaulettes, and gilt badge).

MISS A. PETER :

Three impressions from David Garrick's Seal.

MARTIN J. BLAKE, Esq. :

Twenty-seven coins and cointers, Irish, English and British Colonial.

DUDLEY WESTROPP, Esq. :

West African head-rest of carved wood.

CHARLES McNEILL, Esq. :

Collection (8 pieces) of Ancient Greek sherds from Tiryns.

MESSRS. W. & G. BAIRD :

Five examples showing the processes of three-colour printing.

ROBERT W. W. ALEXANDER, Esq. :

Alabaster statuette of Buddha, brought from Rangoon during the Burmese War.

E. E. WEST, Esq. :

Photos (2) of two commissions (captaincy and adjutancy), given to Henry West by William and Mary in 1689.

LOANS.

645 & 646. J. B. S. MACILWAINE, Esq. :

Collection of pottery and porcelain, lace and embroidery.

647. REV. AMBROSE COLEMAN, O.P. :

Silver chalice, dated 1682; two pewter chalices; rosary of amber and chalcedony beads.

648. BASIL ORPIN, Esq. :

Figure of a Man, in carved ivory and wood.

649. MRS. M. FINUCANE :

Collection of Thibetan metalwork and embroideries from a monastery at Lhasa.

650. MRS. M. L. J. STACK :

Carved oak armoire; oak chest with carved front.

651. MISS HOGAN :

John Hogan's certificate of membership of the Virtuosi of the Pantheon, with uniform (coat, vest and hat) and sword.

652-653. MRS. DAMES LONGWORTH :

Collection of pottery and porcelain—Chinose, Chelsea, Wedgwood Jasper ornaments, and Turner ware; embroidered quilt, English, early 18th century; enamelled silver casket, German; enamelled plaque, French; 11 Assignats of French Revolutionary Period.

645. MISS BASTABLE :

Collection of silver: caddy spoons, etc. (seven pieces).

IV.—MUSEUM CASES AND FITTINGS.

The writer, who has been for more than thirty years in charge of the construction of the Show Cases and Fittings in the National Museum, hopes that a few notes on the principles and practice of making fittings and cases for Museums may be of use to the Curators of the various local Museums, which are now being established throughout the country.

It should not be forgotten, however, that no amount of good museum fittings can compensate for a badly designed museum building, and it is suggested that in designing a building for a museum the following points should be kept in view:—

1st. The Museum should be constructed with a view to the use for which it is intended.

2nd. It should, if possible, be lighted from the roof, or from a clerestory above the cases. Failing this, the lighting should be by means of very large windows along one of the walls—the larger the windows the better, as good lighting is essential.

3rd. The walls should be plain surfaces without architectural detail of any kind, so as to allow of the largest possible amount of wall casing.

4th. The floors should be either of timber, or, if tiled, the colours of the tiles or tesserae should be as unobtrusive as possible and without any decided pattern which might interfere with the placing of the floor cases, etc., or might divert attention from the exhibits.

Galleries round large rooms should be so constructed as to admit sufficient light beneath.

As regards casing the following points are of primary importance:—

1. Wall cases should be built in separate sections, and should be not more than seven feet high, with bases of, say, 18 ins. and not more than 2 ft., so as to bring the sight line as near the centre of the glass as possible. They should be quite independent of each other, and be capable of removal from place to place as may be required. They should be so constructed that, when placed end to end, they will form a continuous line of casing without gaps between, and so that, if placed back to back with mouldings screwed on the ends, they will form a good floor case. When erected to form a continuous wall case one end of every second case in the row should be left

unglazed. This leaves a single glass septum between each case, which allows of any particular case in the row being opened and cleaned without the dust penetrating the rest of the row. Further, every glass pane in the front should be hung so that the exhibits may be properly placed in their positions. The roofs should be glazed and the shelves should be of glass as far as possible; the tops should not be finished with heavy cornices, which are apt to throw shadows.

2. Floor casing should be made in types or musters, uniform in height, and in the depths of the bases, and such bases might with advantage, wherever possible, be so constructed as to form cabinets, to be filled as required with the standard drawers or trays adopted by the Museum. These bases should, however, be as low as practicable, so as to allow the line of sight to be near the centre of the glass.

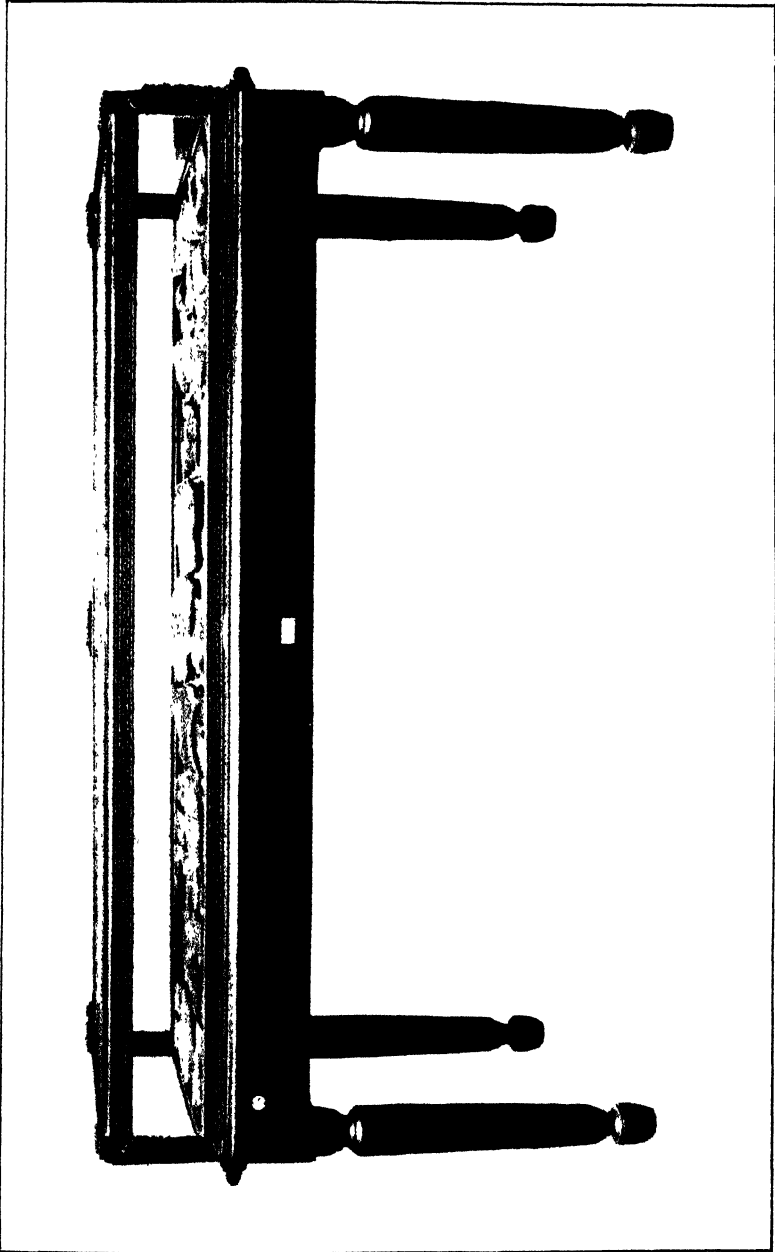
3. Table cases, or desk cases, should be few, as they afford the minimum of exhibition space compared with the floor area occupied.

4. All cases, whether against the walls or on the floors, should be properly dust-proof. The material which, after many trials, has been found best for the purpose is ordinary round lamp wick, let into a groove in the framing of the doors to a depth of about $\frac{1}{3}$ rd of its diameter in such a manner that when the doors are closed the projecting portion is pressed against the hanging stiles and the top and bottom framing of the case, as well as the closing stiles, and in the case of two doors meeting, against the rebate.

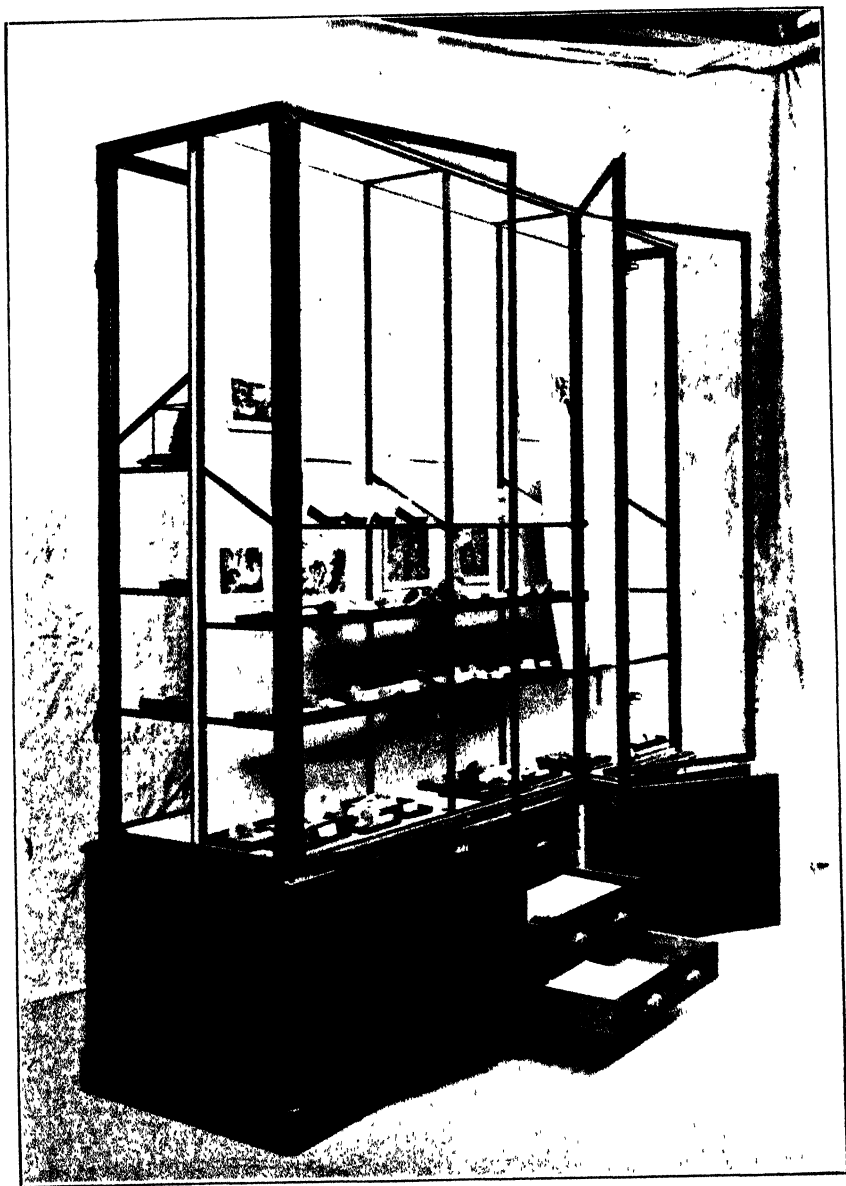
5. All cases should also be secured in such a way that the dust proofing shall be pressed into position as described above.

The locks should be so constructed as to be easily changed, in order that when cases are transferred from one division of the Museum to another the locks of the division to which the cases are transferred can be fixed without injury to the cases, and with the least possible amount of labour, and with the avoidance of placing the locks or keys in the hands of tradesmen. This has been achieved in this Museum by having all cases fitted with hasped screws and plates with staples and spuds fixed in the plates. The hasped screws pass through the plates and are so arranged that they cannot be completely withdrawn owing to a pin which is passed through the screw at about $\frac{1}{2}$ inch behind the plate. The plate is fixed on the front of the framing of the door, and the screw engages with a nut let into the framing of the case. Then the screws are tightened up, the hasp falls over the staple and is secured by a padlock, which itself is made fast on the spud at the bottom of the plate referred to above, the plate being sufficiently long to reach to the bottom of the padlock. These padlocks and fasteners have been manufactured by Messrs. Chubb & Son from our designs.

After many trials we found that the best style of casing was that manufactured throughout of light steel bars, and this form of casing is now much used in all sections of the Museum. They are con-



Steel Case. Type C.



Steel Case. Type D.

constructed of T-steel bars rivetted to angle plates and dust-proofed with timber beads screwed to the web of the T-bar into a groove in which round lamp wick is inserted as previously described. This form of casing, which gives the maximum of sight, and the minimum of framing, is made under a patent held by a Dublin contractor. (Plates XV., XVI., and XVII.)

When the valuable gold ornaments in the collection of the Royal Irish Academy were handed over to the Museum it became necessary that they should be either placed in a strong room or in some style of case which would be more or less fire and thief proof when closed up. Two styles of case were, therefore, devised. The first style is a table case constructed of steel rests on timber under-framing and legs. A shutter outside the glass on the top is constructed of pieces of steel piping slit lengthways and looped into each other; the ends of these run in a groove, and they can, when necessary, be drawn across, forming a very fair safe cover. The second style of case is of a truncated pyramid form, constructed throughout of steel. This case also stands on a timber base. Four steel outer doors are pivotted at the base angles of the pyramid, and when open fall down against the sides of the timber base. When 't is desired to lock up the cases the steel outer doors are closed up and cover the entire of the glass. They are then locked in the usual way.

These cases being constructed throughout of steel are fairly fire and thief proof, and were made from our designs by Messrs. Hobbs, Hart & Co. Similar cases are also used for miniatures and jewellery in the Art division.

The cases for bird groups in the Natural History division are made out of bronze bars drawn through a die, and which, when cut the right length, are brazed to bronze corner pieces. This framework, when glazed with $\frac{1}{8}$ -plate glass, makes a very nice small case or shade, the group of birds, etc., being fitted up on the timber base in which a groove is ploughed and lined with a strip of baize to take the bottom rail of the bronze case or shade, which is then screwed down on the base.

The exhibition of prints, photographs and postage stamps is a great difficulty in a Museum, owing to the amount of wall space which they occupy, and to meet this we devised cabinets with vertical frames or drawers glazed on both sides, but which are so arranged that they cannot be fully withdrawn from the cabinet by the public, the prints or photographs being mounted on both sides of a central septum. Each frame, therefore, exhibits double the amount that the same number of frames would exhibit on a wall or screen, the exhibits being well displayed and preserved from light. Four different sizes of these cabinets are in use in the Museum.

Coins and medals can also be very well displayed in these cabinets by omitting the septum from the drawers and fixing a sufficient number of cross rails into which wire clips holding the coins are fixed. This enables the two sides of each coin to be viewed, and

avoids the necessity of acquiring more than one specimen of each coin. The first of these cabinets was made in the Museum workshops, the slides being introduced from the back and drawn out for inspection in front; this was afterwards found to be inconvenient, as in order to withdraw the frames from the cabinet for the purpose of charging them, it was necessary to open the back, and to accomplish this the cabinet had to be moved out from the wall, which, in the case of two-storey cabinets, is a risky matter owing to their weight. An arrangement was, therefore, devised by which portion of the top of the cabinet was hinged so as to allow the sliding frames to be withdrawn from the front.

This arrangement proved so successful that subsequently large-sized cabinets were made on a similar plan, the frame being supported by carriers which draw out beneath them when the frames are pulled out for inspection. (Plate XVIII.)

The trays for holding specimens are made in multiples of a tray, 2 ins. by 2 ins. outside measurement, thus saving space. These are made very rapidly with a power-driven tenoning machine specially devised for the purpose.

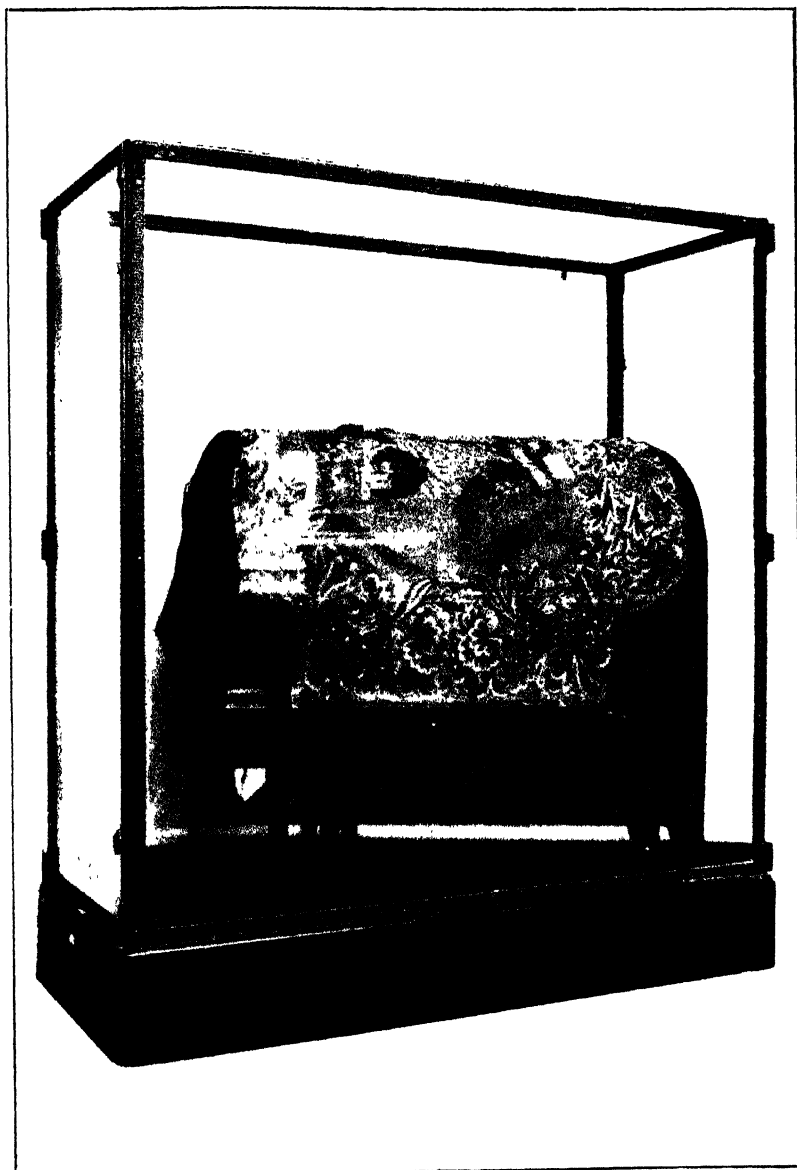
The drawers for storing are made in depth multiples of a drawer, 2 ins. deep and 2 ft. square, on the outside. The bottom edge of each drawer is fitted at the sides with $\frac{1}{2}$ -inch beads which run in $\frac{1}{4}$ -inch grooves on the inside of the cabinet; these grooves are formed by screwing $1\frac{1}{2}$ -inch slips of $\frac{1}{4}$ -inch hard wood horizontally against the trestles on which the cabinet is constructed, the measurement from top to top of each pair of slips being 2 inches.

For the frames the standard selected was an Imperial frame, and by making frames in multiples and sub-multiples of it in outside measurement, a set of frames suitable for most objects for which such are required was obtained, with the added advantage that wall space was economised.

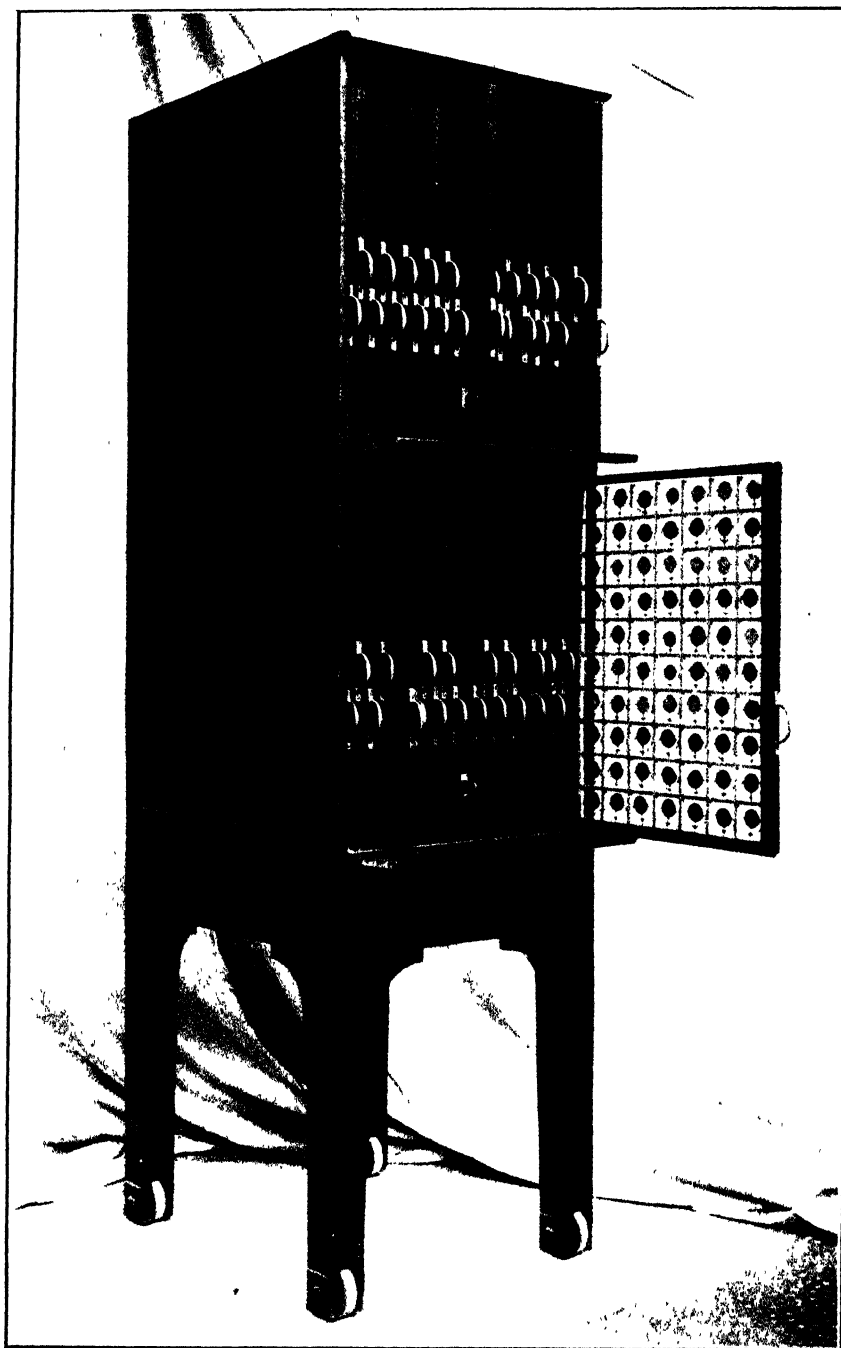
The shelving for floor cases is constructed as follows :—Capitals and bases are cast in gunmetal, with Doric mouldings, and bored out one inch in diameter to fit one inch lacquered brass tubing. When a shelf is required, four or six bases are screwed to the floor of the case, and the same number of capitals to the under side of a timber shelf; four or six pieces of the tubing are cut of the proper height and slipped into the bases, and the caps attached to the shelf are slipped over the tops of the tubes and the shelf is at once in position.

Adjustable shelves in wall cases are usually fixed on T-iron supports, the web of the verticals at front and back of the cases being bored at one inch intervals. The horizontal shelf supports of T-iron are slotted to fit the webs of the vertical irons at front and back. These horizontal shelf supports rest on pins driven through the holes in the webs of the vertical bars, and the shelves lie on the wings of the horizontal shelf supports.

H. B. W.



Steel Case. Type E.



Draw-out Frame Cabinet.

OFFICIAL DOCUMENTS.

I.—AGRICULTURE.

Scheme No. 23.

SCHEME FOR ENCOURAGING THE BREEDING OF IRISH DRAUGHT HORSES.

1. The objects of this scheme are to increase the number and to improve the quality of Irish Draught Horses.

2. The type of animal it is desired to encourage is one free from all trace of English or Scotch cart horse blood, standing not less than 15.2 hands high, with short, clean, flat legs, well set joints and good feet, good head and rein, well laid back shoulders, and displaying throughout its conformation a sufficiency of power to warrant it doing general farm and harness work. The action should be free and light stepping.

3. At centres and on dates of which due notice will be given, shows of mares of the Irish Draught type will be held by the Department. Subject to the provisions of this scheme, mares selected at these shows as sound and suitable for breeding will be awarded prizes of £5 (Five Pounds) each.

4. Selected mares must be entered on the prescribed form by their owners in a Register to be called the Irish Draught Horse Register, which will be kept by the Department. The forms for the purpose may be obtained free on application to the Department.

5. The Department will issue annually a Register of Stallions of the Irish Draught type, to be selected in accordance with the regulations for the registration of stallions under the Department's general Horse Breeding Scheme.

6. Fillies out of mares entered in the Register and got by a registered Irish Draught stallion will, when two years old, be eligible for entry in that Register provided they are passed by the Department as sound and suitable.

A limited number of such registered fillies, selected by the Department and retained for service by an approved registered Irish Draught stallion, will be awarded, on such conditions as the Department may prescribe, a premium of £20 per annum for not more than five seasons provided a live foal resulting from such service during the preceding year is produced during each of the five seasons in question.

7. Colts out of mares entered in the Register and got by registered Irish Draught stallions will, on inspection as two-year-olds, be purchased by the Department for a sum of not less than £200 each provided they are passed by the Department as sound and suitable for registration.

8. The Department will, on the production of the necessary vouchers, refund the amount of the service fee and the cost of sending for service by a registered Irish Draught stallion each mare entered in the Register.

9. In future a portion of the Department's grant in respect of agricultural shows will be ear-marked for classes of mares entered in the Register, and for the progeny of such mares.

10. The decision of the Department in all matters relating to this scheme shall be final.

December, 1910.

Form A. 180 (a).
1911.

THE ALBERT AGRICULTURAL COLLEGE, GLASNEVIN, DUBLIN.

SESSION 1911-12.

The Albert Agricultural College is situated on the north side of Dublin in a healthy situation about 170 ft. above the sea level. It is easily reached by tram to the Glasnevin terminus, from which it is distant less than a mile. The College consists of a residence for about sixty students, together with a farm, orchard, and gardens, all covering an area of about 180 acres.

The College provides two distinct courses of instruction—one for farmers, the other for gardeners. The former or Agricultural Course occupies in the Department's scheme of agricultural education a position intermediate between the instruction given at the Agricultural Stations and that provided by the agricultural faculty of the Royal College of Science, Dublin. The Horticultural Course is intended for selected pupils who are seeking to qualify for the post of Instructor in Horticulture. (For particulars relative to the Horticultural Course see separate leaflet, A 153a.)

AGRICULTURAL COURSE.

This course is intended for young men who desire a technical and practical knowledge of agriculture, to fit them for entrance to the Royal College of Science, Dublin, for becoming farmers, or for engaging in any other occupation—such as creamery management—which requires technical training in the sciences underlying agriculture. It includes instruction in agriculture in the classroom, farmyard, and fields, supplemented by lessons in dairying, horticulture, poultry management, bee-keeping, and veterinary hygiene. The elements of physics, chemistry, botany, zoology, and entomology are taught so far as is necessary to the proper understanding of the principles underlying the most approved farmyard practice.

Instruction is also given in bookkeeping, surveying, and woodwork, while literature, mathematics, and drawing receive such attention as is found requisite.

Every encouragement is given to the pursuit of athletics and to the development of social intercourse among the students.

The College discussion Society meets frequently throughout the session. The papers read before it relate to topics of current interest to the farming community.

The library is supplied with standard works on agriculture, and copies of the best farming periodicals are procured regularly for students' use.

The Staff.—The staff consists of Principal, House Masters, Agriculturist, and teachers of chemistry, botany, zoology, veterinary

hygiene, horticulture, dairying, poultry keeping, beekeeping, and woodwork. A competent Drill Instructor attends twice weekly to see to the physical training of the students.

The Clergy of the different denominations also visit the College weekly to give religious instruction. The domestic comfort and bodily health of the students are under the care of an experienced Matron.

The Session.—The course of study extends over a session of ten months, which for the year 1911-12 will open on Tuesday, the 10th October, 1911, and end on Friday, the 9th August, 1912. There will be two intervals, each of about a fortnight—during which students will return to their homes—one at Christmas and the other at Easter.

College Diploma.—The College diploma is awarded partly on the result of the sessional examinations and partly on the work done throughout the year. It is of two classes, the first being reserved for those students who add to an intelligent grasp of scientific principles a high standard of skill in practical farm work.

Prizes are to be given by the Department for progress made, for work done, and for services cheerfully rendered to the common weal. These prizes are awarded after consultation with the Principal, and not merely on marks obtained at the examination.

Conditions of Admission.—Admission to the College is conditional on passing the entrance examination and furnishing evidence of good health and character. Only resident students who are prepared to stay the whole session and to take the full curriculum, are admitted. They must not be less than 17 nor more than 30 years of age on 1st September, 1911.

The entrance examination will be held in the first week in September, 1911, at four centres situated one in each province. Each applicant for admission will be notified in due course as to the centre at which he will be required to present himself. No expenses will be allowed in respect of attendance.

The subjects included in the examination will be as follows:—

- (1.) *English*, including dictation and composition.
- (2.) *Arithmetic*, including calculations requiring a thorough knowledge of weights and measures, decimal and vulgar fractions, percentages, and interest.
- (3.) *Mathematics*.—The elements of mensuration—lengths, areas, volumes; and algebra to simple equations.
- (4.) *Agriculture*.—The questions on this subject are framed with a view to testing knowledge acquired by practical experience of farm work. No text-book is prescribed or recommended. The examination may be oral as well as written.

Fees.—The fees for tuition, board, residence, laundry, and ordinary medical attendance during the entire session are:—

For students whose parents or guardians derive their means of living mainly from farming in Ireland, . . .	£15
For students other than the foregoing,	£50

The fees are payable to the Principal in two instalments, viz., one of £10 (or £30) on entrance and the balance on 1st February. In addition to the instalment of the fee payable on entrance each student must deposit with the Principal a sum of £3 to cover the cost of repairs to clothing, and of books and stationery. The unexpended

balance, if any, of this deposit will be returned at the close of the session.

Outfit.—Students are required to provide themselves with a proper outfit, particulars of which will be supplied to candidates successful at the entrance examination.

Application for Admission.—Application must be made on the prescribed form, to be obtained from—

THE DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

Applications will be dealt with in the order of their receipt in the Department's Offices. They should be forwarded not later than the 15th August, 1911.

Form A. 153 (a).
1911.

INSTRUCTION IN FRUIT-GROWING AND GENERAL GARDENING.

HORTICULTURAL SCHOOL,
ALBERT AGRICULTURAL COLLEGE, GLASNEVIN, DUBLIN.

SESSION, 1911-12.

The course provided at this School is suited for men who have already had experience in fruit-growing and general gardening such as can be obtained by working for four or five years under a fully qualified gardener. In addition to the practical work in the gardens, class-room instruction is given to the students to enable them to understand the scientific principles underlying horticulture.

Applicants for admission to the 1911-12 session must be at least twenty years of age on the 1st October, 1911, in good health and of strong constitution. They should have received a fair general education, and will be required to produce evidence that they have been employed regularly at garden work.

Students will be admitted on probation as the result of an examination which will be held in Dublin on the 25th August, 1911. The subjects included in the examination will be :—

- (1) English—to be tested by dictation and a short letter.
- (2) Arithmetic—the first four rules, simple and compound; a knowledge of weights and measures; and percentages.
- (3) Practical Fruit-growing and Gardening.

A high standard will not be expected in English or arithmetic. The examination in practical fruit-growing and gardening will cover the whole range of these subjects.

No expenses will be allowed to candidates in connection with their attendance at this examination.

Successful candidates will be required to enter on their duties on the 10th October, 1911.

The session will close on the 30th September, 1912. Students may be retained at the School beyond that date, if, in the opinion of the Department, they would profit by an extension of the course.

Students are provided with furnished lodging, including coal and light, and receive an allowance of 14s. per week during their first

session and of 16s. per week during their second session. They are required to find their own board.

Students of the Horticultural School are subject to the conditions under which the gardeners at the College are employed.

The Department do not undertake to employ or to procure employment for students at the close of the courses, but the names of those who qualify are sent to County Committees of Agriculture with an intimation that they are eligible for appointment by such Committees, to instructorships under the Department's Scheme of Instruction in Horticulture and Bee-Keeping.

Several men who have passed through the School are now employed by County Committees of Agriculture.

Application to attend the examination must be made on the prescribed form, to be obtained from

THE DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

Last date for making application—11th August, 1911.

FORM A. 176 (b).
1911.

AGRICULTURAL EDUCATION FOR YOUNG MEN.

SESSION 1911-12.

FARM APPRENTICES.

AGRICULTURAL STATION, BALLYHAISE, CO. CAVAN.

Young men who intend to follow the farming profession and who desire to acquire a practical knowledge of its several branches are admitted to the Station as apprentices.

Applicants for apprenticeships must be not less than seventeen years of age on the 1st October, 1911, and each must give an undertaking that it is his intention to become a farmer in Ireland. He must also provide, in his application form, evidence of a sure prospect of obtaining a farm of his own, or *bond fide* occupation on a farm. Preference will be given to applicants from the province of Ulster, especially to those who have attended a course of instruction under the Department's Scheme of Winter Agricultural Classes. It will also be a recommendation if the applicant produces a certificate from the Itinerant Instructor in Agriculture for the County in which he resides that he has taken advantage of the Instructor's lectures and demonstrations and has shown a desire to improve his knowledge of tillage farming.

The apprentices are required to reside in Ballyhaise House attached to the Station, where they are under the immediate supervision of the Principal. They must take part, as directed, in all the work of the farm.

The Session will commence on the 10th October, 1911, and close on the 9th August, 1912. It will be divided into two terms, viz., the Winter Term, from the opening of the Session to the 3rd April, 1912; and the Summer Term, from 16th April, 1912, to the close of the Session. There will be an interval at Christmas of about a fortnight,

during which the apprentices may return to their homes. Apprentices who are required at home for farm work during the spring and summer may leave the Station at the end of the Winter Term. New apprentices may be admitted for the Summer Term to fill vacancies thus caused.

The course of training will include:—(1) classroom instruction in agricultural subjects which have a direct bearing on farming in Ireland; (2) instruction in subjects of a general educational nature, such as English, arithmetic, book-keeping, &c., which will be useful to the apprentices in their future career as farmers; (3) practical instruction in all the work of the fields and farmyard in connection with the various seasonable operations and with permanent improvements; (4) lessons in veterinary hygiene and woodwork.

The Winter Term will be occupied principally with classroom instruction in agricultural and general subjects. The following subjects will be included in the agricultural course:—

Soils, tillages, manures (natural and artificial), seeds, grasses, weeds, treatment of pastures, cropping, management of live stock (including winter dairying), valuation of manures and feeding stuffs, elementary chain surveying, and elementary science, explanatory of the principles underlying ordinary farm practice.

The Summer Term will be given almost exclusively to practical training in the outdoor work of the farm.

An apprentice will not be retained at the Station if he is found to be unable to do a fair day's work, or to be otherwise unsuitable.

Admission as an apprentice is conditional on passing the entrance examination, and producing certificates of good health and character.

Applicants who have been pupils at Winter Agricultural Classes will be exempted from the entrance examination provided their attendance and progress at the Agricultural Classes have been satisfactory.

ENTRANCE EXAMINATION.

Particulars as to the date of this examination and the place at which it will be held will be notified to each applicant.

The following subjects are included in the examination:—

Arithmetic—Simple calculations requiring a knowledge of weights and measures, vulgar and decimal fractions, and percentages.

English—Dictation, Grammar and Composition.

The examination will be of such a nature as should present little difficulty to a young man who has passed the fifth standard at a National School.

No candidate will be admitted as an apprentice whose general education is too backward to admit of his taking advantage of the classroom instruction, or who is, in the opinion of the Department, unsuitable in any other respect for an apprenticeship.

No expenses will be allowed to candidates in connection with their attendance at this examination.

FEEs.

1. For apprentices whose parents or guardians derive their means of living mainly from farming in Ireland the inclusive fees for tuition, board, residence, laundry and ordinary medical attendance are proportional to the aggregate tenement valuation of their holdings, as follows:—

	<i>Per Session</i>
Where the aggregate valuation does not exceed £20,	£3
Exceeds £20 but does not exceed £40,	£6
Exceeds £40 but does not exceed £100,	£10
Exceeds £100,	£15

2. For apprentices not included in the foregoing classes, £20

These fees are in respect of the Winter Term. No additional fees are required from apprentices who are retained for the Summer Term. Apprentices admitted for the Summer Term only pay fees at half the foregoing rates.

Fees must be paid to the Principal on entrance, and in addition a sum of £1 must be deposited at the same time to cover the cost of repairs to clothes, the purchase of books, stationery, &c. The unexpended balance, if any, of this deposit will be refunded at the close of the Session.

FREE PLACES.

A small number of free places provided under the terms of the Anne Hall Bequest are available for applicants from the Counties of Fermanagh and Londonderry. Applications for these places must be addressed in the first instance to the Agricultural Superintendent, Royal Dublin Society, Leinster House, Dublin.

OUTFIT.

Apprentices will be required to provide themselves with a proper outfit, particulars of which will be supplied to the successful candidates.

APPLICATIONS FOR ADMISSION.

Application for admission must be made on the prescribed form to be obtained from—

THE DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

The application will be dealt with in the order of their receipt in the Department's offices.

FORM A. 134 (a).
1911.

AGRICULTURAL STATION, BALLYHAISE,
CO. CAVAN.

SESSION 1911-12.

CREAMERY COURSE.

Provision has been made at the Agricultural Station, Ballyhaise, for a course of technical instruction for young men who intend to become Creamery Managers.

The course will commence on Tuesday, 10th October, 1911, and will terminate on Friday, 8th March, 1912. There will be an interval of about a fortnight at Christmas.

The following subjects will be included in the course:—Physical Science in relation to Creamery work; Dairy Bacteriology; Dairy Technology; Dairy Engineering; Business Methods.

The course will be particularly suitable for those who have had experience of creamery work.

Students who intend to compete for certificates under the Department's scheme for improvement in the management of creameries will have special facilities for the study of the subjects prescribed for the examination in connection with these certificates which is to be held in March, 1912.

At the close of the technical course at Ballyhaise Agricultural Station, a limited number of the best students will be afforded facilities for learning the practice of Creamery Management during the summer of 1912, in a selected creamery in Ireland. Such students will receive a maintenance allowance at the rate of ten shillings per week, in addition to free instruction, while in attendance at the creamery.

Applicants for admission to the course must be at least eighteen years of age on the 1st October, 1911.

Admission is conditional on passing the entrance examination, producing certificates of good health and character, and paying the specified fee.

Applicants who fulfil the foregoing conditions are admitted in the order in which their applications, on Form A/134, are received in the Department's offices, preference being given, however, to those who have experience of creamery work.

Students are required to take part, as directed by the Principal, in all branches of the outdoor work of the Station which relate to dairying. They must conform strictly to the disciplinary rules in force at the Station.

ENTRANCE EXAMINATION.

Particulars as to the date of this examination and the place at which it will be held will be notified to each applicant.

The following subjects are included in the examination:—

Arithmetic.—Calculations requiring a knowledge of weights and measures, decimal and vulgar fractions, areas, volumes and percentages.

English.—Dictation, Grammar and Composition.

No expenses will be allowed to candidates in connection with their attendance at this examination.

FEE.

The fee for tuition, board, residence, laundry and ordinary medical attendance during the course will be £10.

The fee must be paid to the Principal of the Station on entrance, and, in addition, a sum of £1 must be deposited at the same time to cover the cost of repairs to clothes, the purchase of books, stationery, &c. The unexpended balance, if any, of this deposit will be refunded at the close of the course.

OUTFIT.

Students will be required to provide themselves with a proper outfit, particulars of which will be supplied to the successful candidates.

APPLICATIONS FOR ADMISSION.

Application for admission must be made on the prescribed form to be obtained from

THE DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

Applications should be forwarded as soon as possible, and not later than 1st September, 1911.

FORM A. 176 (c).

AGRICULTURAL EDUCATION FOR YOUNG MEN.

SESSION 1911-1.

FARM APPRENTICESHIPS.

AGRICULTURAL STATION, CLONAKILTY, COUNTY CORK.

Young men who intend to follow the farming profession and who desire to acquire a practical knowledge of its several branches are admitted to the Station as apprentices.

The farm is managed by an experienced agriculturist, under whose direction the apprentices are required to take part in all the work of the fields and of the farmyard, whether in connection with seasonable operations or permanent improvements. In the class-room attention is given, in the evenings and at other times when outdoor work is not pressing, to English, Arithmetic (including Surveying), Book-keeping and Technical Agriculture. This instruction is not intended as a preparation for any examination. It is of such a character as to continue the general education of the apprentices, and be useful to them in their future career as farmers.

Applicants for apprenticeships must be not less than seventeen years of age on the 1st October, 1911, and each must give an undertaking that it is his intention to become a farmer in Ireland. He must also provide, in his application form, evidence of a sure prospect of obtaining a farm of his own, or *bonâ fide* occupation on a farm. Preference will be given to applicants from the province of Munster, especially to those who have attended a course of instruction under the Department's Scheme of Winter Agricultural Classes. It will also be a recommendation if the applicant produces a certificate from the Itinerant Instructor in Agriculture for the County in which he resides that he has taken advantage of the Instructor's lectures and demonstrations and has shown a desire to improve his knowledge of tillage farming.

The apprentices are required to reside in the buildings attached to the Station, where they are in the charge of a house master and matron.

The Session will commence on the 10th October, 1911, and will terminate on the 9th August, 1912. There will be two intervals, each of about a fortnight, during which the apprentices may return to their homes—one at Christmas and the other at Easter.

Admission as an apprentice is conditional on passing the entrance examination, producing certificates of good health and character and paying the required fee according to the scale indicated overleaf.

Applicants who have been pupils at Winter Agricultural Classes will be exempted from the entrance examination provided their attendance and progress at the Agricultural Classes have been satisfactory.

An apprentice will not be retained at the Station if he is found to be unable to perform a fair day's work, or to be otherwise unsuitable.

ENTRANCE EXAMINATION

Particulars as to the date of this examination and the place at which it will be held will be notified to each applicant.

The following subjects are included in the examination :—

Arithmetic—Simple calculations requiring a knowledge of weights and measures.

English—Dictation, Grammar and Composition.

The examination will be of such a nature as should present little difficulty to a young man who has passed the fifth standard at a National School.

No candidate will be admitted whose general education is insufficient to enable him to profit by the class-room instruction, or who is, in the opinion of the Department, unsuitable in any other respect for an apprenticeship.

No expenses will be allowed to candidates in connection with their attendance at this examination.

FEEs.

1. For apprentices whose parents or guardians derive their means of living mainly from farming in Ireland the inclusive fees for tuition, board, residence and ordinary medical attendance are proportional to the aggregate tenement valuation of their holdings, as follows :—

	<i>Per Session</i>
Where the aggregate valuation does not exceed £20,	£3
Exceeds £20 but does not exceed £40,	£6
Exceeds £40 but does not exceed £100,	£10
Exceeds £100,	£15

2. For apprentices not included in the foregoing classes, £20

Apprentices will be notified of the fees payable by them. Fees must be paid to the Superintendent on entrance, and in addition a sum of £1 must be deposited at the same time to cover the cost of repairs to clothes, the purchase of books, stationery, &c. The unexpended balance, if any, of this deposit will be refunded at the close of the session.

OUTFIT.

Apprentices will be required to provide themselves with a proper outfit, particulars of which will be supplied to the successful candidates.

APPLICATIONS FOR ADMISSION.

Application for admission must be made on the prescribed form to be obtained from—

The Department of Agriculture and
Technical Instruction for Ireland,
Upper Merrion Street, Dublin.

The applications will be dealt with in the order of their receipt in the Department's Offices. They should be forwarded not later than 14th August, 1911.

FORM A. 181 (a).

FORESTRY INSTRUCTION.

A limited number of apprenticeships in Forestry will be awarded on the result of an examination which will be held in Dublin on the 7th September, 1911.

Applicants for apprenticeships must be not less than eighteen years of age and not more than twenty-five years on the 1st October, 1911. They should be in good health, and of strong constitution, and have received a fair general education. Preference will be given to those applicants who have had experience in working in woods.

The subjects included in the examination will be—

English—To be tested by dictation and a short letter.

Arithmetic—The first four rules, simple and compound; a knowledge of weights and measures, proportion, and percentages.

No expense will be allowed to candidates in connection with their attendance at this examination.

The successful candidates will be required to work under the directions of a skilled foreman, for at least one year, in one of the woods belonging to the Department. During this period apprentices will be given facilities for improving their general education. Apprentices who acquit themselves in such a manner as to lead the Department to believe that they are likely to make suitable foresters may, at the end of this period, be selected to attend a further course of instruction at Avondale Forestry Station, Rathdrum. The duration of the course at Avondale may extend from one to two years, and in addition to class-room instruction apprentices will be required to take part in the work of the woods attached to the Station or in such of the woods belonging to the Department as may be decided on from time to time.

Apprentices will be required to enter on their duties on the 3rd October, 1911.

Each apprentice will receive during the first year an allowance at the rate of 14s. per week, with furnished lodging. When in receipt of this allowance the apprentices will be required to find their own board. Such apprentices as are selected to attend at Avondale station for a further period of training will be provided with free board, lodging and education and receive allowances at the rate of 5s. per week.

Apprentices must undertake to conform with the rules and regulations made from time to time in connection with their work in the Department's woods and at the Forestry station.

The engagement between apprentices and the Department may be determined at any time by one week's notice on either side.

The Department do not undertake to employ or to procure employment for apprentices on completion of their training.

Applications for apprenticeships must be made on the prescribed forms, to be obtained from

THE DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

Last date for making application—24th August, 1911.

Scheme No. 15.
[REVISED.]

SCHEME FOR ENCOURAGING IMPROVEMENT IN THE MANAGEMENT OF CREAMERIES AND AUXILIARY CREAMERIES.

GENERAL REGULATIONS.

1. The object of this Scheme is to encourage improvement in the manufacture and marketing of dairy produce by providing facilities for obtaining advice on technical and business methods affecting the management of creameries and auxiliary creameries.

2. For the purposes of this Scheme—

(a.) The term "creamery" shall mean premises adapted and utilised for the manufacture of butter in commercial quantities from cream separated by centrifugal force from the commingled milk supplies of a number of cowkeepers: Provided that the premises are not, and do not require to be registered under the Sale of Food and Drugs Acts, 1875 to 1907.

The manufacture of butter in commercial quantities shall mean that on every day on which milk or cream is treated at the premises the quantity so dealt with is sufficient to make at least 56 lbs. of butter; but the Department may in their discretion regard as a creamery, premises at which the quantity of milk or cream dealt with on any one or more days is insufficient to make 56 lbs. of butter.

(b.) The term "auxiliary creamery" shall mean any premises adapted and utilised for the separation of cream by centrifugal force from the commingled milk supplies of a number of cowkeepers but not utilised for the manufacture of butter: Provided that the premises are not, and do not require to be, registered under the Sale of Food and Drugs Acts, 1875 to 1907.

(c.) The term "creamery butter" shall mean butter which has not been blended nor reworked and which has been made in a creamery from cream separated by centrifugal force from the commingled milk supplies of a number of cowkeepers.

(d.) The term "year" shall mean the twelve months commencing on the 1st January and terminating on 31st December.

3. Any creamery or auxiliary creamery, from which application (on Form A. 175, signed by the proprietor or by the president or

chairman of the society or company owning the creamery or auxiliary creamery, as the case may be, and by the manager thereof) is duly received and accepted by the Department, will be inserted on the list of creameries and auxiliary creameries which are visited by the Department's Instructors in Dairying. Provided that a creamery at which cream or milk is received from one or more auxiliary creameries which are under the control of the proprietors of the creamery will not be entered or retained on the list in question unless all the auxiliary creameries referred to are at the same time entered or retained on the list. On the occasion of each visit all necessary advice will be afforded on matters relating to creamery management, and a report embodying the Instructor's observations on the condition and working of the creamery or auxiliary creamery visited will be entered in a special report book to be supplied by the Department, and to be carefully preserved at the creamery or auxiliary creamery, as the case may be, and produced for the inspection of the Department's Officers when so required. Supplementary reports will be furnished, as may be thought fit, in special circumstances, *e.g.*, when suggestions for specifications for machinery and sketch-plans or notes for alterations in buildings are required.

4. A creamery or auxiliary creamery from which application on Form A. 175 is accepted will be visited by the Department's Instructors until notification is given to the contrary on either side. A creamery or auxiliary creamery on the list of those receiving visits from the Instructors at the date of publication of the Scheme will be considered as entered for visits under this Scheme, unless notification to the contrary is received.

5. Applications (on Form A. 174, signed by the proprietor or by the president or chairman of the society or company owning the creamery or auxiliary creamery, as the case may be, or by the manager thereof) may be made for visits of the Instructors for any special purposes, *e.g.*, the preparation of sketch-plans, and notes for the construction or alteration of buildings, or suggestions for specifications for machinery. It is, however, to be understood that, except in cases of special urgency, applications of this nature cannot receive prior attention to those made on Form A. 175.

Applications on Form A. 174 will be considered only from creameries included in the list of those visited by the Instructors in connection with applications on Form A. 175.

6. The premises and methods of creameries and auxiliary creameries entered on the list of those visited by the Department's Instructors must be open at all reasonable times to inspection by the Department.

7. The Department may, without assigning any reason, refuse to send an Instructor to any creamery or auxiliary creamery.

8. The Department will publish from time to time a List containing the names and addresses (with such other particulars as may be thought fit) of those creameries and auxiliary creameries entered for inspection which satisfy the Department in the following matters:—

- (1.) That proper care has been taken by the proprietors and staff to secure that the milk or cream dealt with at the creamery or auxiliary creamery is supplied in a clean condition and in clean vessels.
- (2.) That proper care has been taken by the manager and staff to maintain cleanliness and order in the management and condition of the creamery or auxiliary creamery.

- (3.) That the book-keeping and business methods are efficient.
- (4.) That the buildings and equipment are in good condition and adequate for the business.
- * (5.) That suitable packages are used for butter, and in the case of 56 lb. boxes and 112 lb. kiels that they conform with the standard specifications (see Leaflet No. 60).
- * (6.) That apprentices and pupils (if any) receive efficient training and instruction.
- * (7.) That, if the creamery is included in the latest published List, butter is forwarded to each of the Surprise Butter Inspections held by the Department after the date of publication.

[Failure to forward duly a package of butter from a creamery to any one Surprise Butter Inspection will, except in circumstances which in the opinion of the Department afford a satisfactory excuse for such failure, disqualify the creamery for inclusion in the next List to be published by the Department.]

SURPRISE BUTTER INSPECTION.

9. On a number of occasions at the option of the Department a telegram may be forwarded to any creamery on the latest published List of creameries (see clause 8), requesting the recipient to "send butter to-day to Department's Surprise Inspection." Provided that a creamery which is removed from the list of those visited by the Department's Inspectors in Dairying or which fails to comply with clauses 8 (1), 8 (2), 8 (3), 8 (5), or 8 (6) of this scheme shall not be entitled to participate in the Inspections.

The butter shall be sent to an address in Dublin or elsewhere, which will be communicated to the Manager of the creamery.

10. Between the 1st October and 1st May the telegrams will be issued on Mondays, Wednesdays and Fridays only.

11. The butter at each Inspection will be judged one or more times by one or more persons appointed by the Department, and in one or more sections according as the Department may consider desirable.

12. The following scale of points will be adopted as the basis in judging the butter sent to the Inspections:—

Flavour,	.	.	.	60 points.
Texture,	.	.	.	30 "
Colour,	.	.	.	5 "
† Packing and finish,	.	.	.	5 "
Total,	.	.	.	100 points.

A schedule giving in such form as the Department may decide, the results of the judging of the butter received from each creamery participating in the Inspection will be issued after each Inspection to all the participating creameries. In addition notes of any particular defect or defects observed in any lot of butter may be communicated

* Not applicable in the case of auxiliary creameries.

† See Clause 8 (5)

to the manufacturer for the purpose of indicating the points in which improvement is especially required. If so desired an Instructor in Dairying will be directed to visit the creamery for the purpose of assisting the Manager to remedy any defect, which can be most satisfactorily dealt with by means of such assistance.

13. The following conditions must be complied with in respect of each lot of butter forwarded to the Inspections:—

- (1.) The butter forwarded must be a sample of the ordinary creamery butter made at the creamery on the day on which the telegram is received, from cream separated on a preceding working day, and must be forwarded by passenger train, carriage paid, on the day on which the telegram is received.
- (2.) The quantity of butter forwarded must be either 56 lbs. or 112 lbs. packed in a box, keg, or kiel, similar to those in regular use at the creamery. In special circumstances the Department may, however, in the case of Inspections held between 1st October and 1st May, accept a smaller quantity of butter.
- (3.) Excepting the direction labels supplied by the Department for use during the current year, there must be no mark or label in or on the butter which might indicate its origin.
- (4.) The carrying company's receipt must be transmitted to the Department by post on the day on which the butter is forwarded. Unless the carrying company's receipt is received at the office of the Department by the ordinary postal delivery on the morning of the day following that on which the telegram is despatched, the butter will be liable to be disqualified.

Failure to comply with any one of the foregoing conditions will render butter in respect of which such failure takes place liable to be disqualified from participating in the Inspection to which it is forwarded.

14. The butter forwarded for the Inspections will be paid for by the Department at the end of the year. The prices given will be based on the current market rates prevailing for the various classes of butter at the dates on which the telegrams are despatched, and shall be determined by the judges.

Provided that any butter which reaches the Department in an unsatisfactory condition or which develops defects which, in the opinion of the Department should be seen by the manufacturer, may be returned to him at his own risk, and will not be paid for.

15. The Department may, without assigning any reason, refuse to accept for the Inspections butter from any creamery.

16. In all cases of dispute in matters connected with any part of this Scheme the decision of the Department shall be final.

LOCAL SURPRISE BUTTER INSPECTIONS.

The Department having decided to discontinue the awarding of prizes at their Surprise Butter Inspections* are prepared instead to

Hitherto described as "Surprise Butter Competitions."

devote portion of their funds to encouraging Local Surprise Butter Inspections of a similar kind, but carried out by creamery proprietors and managers themselves. All creameries in the district, whether taking part in the Department's Scheme or not, will be entitled to take part in the Local Inspections subject to compliance with the prescribed conditions.

Creamery proprietors and managers desirous of establishing a system of Local Surprise Butter Inspections in any district in Ireland should first ascertain the number of creameries from which butter would be regularly sent to the Local Inspections. A Local Committee representative of the proprietors and managers of all the creameries which would participate in the Local Inspections should then be formed. This Committee should be entrusted with the carrying out of all the arrangements in connection with the Inspections. The Department will be prepared to consider an application from a duly constituted Committee of this kind for a grant towards the expenses of holding Local Surprise Butter Inspections.

The grant to be made by the Department will be subject to the following conditions:—

- (1.) That a sufficient number of creameries participate regularly in the Inspections.
- (2.) That all the regulations made by the Local Committee are submitted to the Department for approval and are approved by the Department.
- (3.) That a proportion of the cost of the Inspections is contributed by the proprietors of participating creameries.
- (4.) That the Local Committee accepts complete responsibility for the proper carrying out of the Inspections.
- (5.) That the Inspections are carried out strictly in accordance with the regulations as prescribed by the Local Committee and approved by the Department.

WINTER COURSES OF INSTRUCTION.

During the winter a course of instruction in the subjects of examination for Certificates will be provided. At the close of this course a limited number of the best students will be afforded facilities for learning the practice of creamery management during the summer in a selected creamery. Such students will receive a maintenance allowance at the rate of ten shillings per week, in addition to free instruction, while in attendance at the creamery.

Attendance at the annual course of instruction for students of agriculture at the Albert Agricultural College, Glasnevin, is recommended as a preliminary general training for young men who may intend to become creamery managers.

SCHOLARSHIPS FOR STUDENTS OF CREAMERY MANAGEMENT.

One or more scholarships, tenable at the Royal College of Science, Dublin, may be offered yearly to students who desire to specialise in subjects relating to the management of creameries. Particulars as to the date, place, and subjects of examination will be published by the Department in due course.

CERTIFICATES.

An examination will be held annually in March in technical subjects as applied to creamery management, and a certificate of having passed the examination will be awarded to successful competitors. The subjects of the examination are set forth in Appendix II. Due notice of time and place will be given to applicants.

A special certificate designated the "creamery manager's certificate" will be granted to candidates who having passed the examination in technical knowledge satisfy the Department with regard to their practical ability as creamery managers.

Applications for admission to the examination should be made, not later than 15th February, on Form A. 137, to be obtained from the Department, and must be accompanied by a deposit of £1, which will be returned if the candidate presents himself for examination, or if his application is not accepted.

The Regulations of this Scheme are subject to revision from time to time.

The Appendices and List of Creameries and Auxiliaries published by the Department in connection with this Scheme are printed separately, and may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin. Letters of application so addressed need not be stamped.

January, 1911.

SPREAD OF BEE DISEASE.

WARNING TO IRISH BEE-KEEPERS.

The serious attention of Irish bee-keepers is directed to the fact that the disease known as the "Isle of Wight Bee Disease" has recently spread to the mainland of England, and has wrought great destruction amongst apiaries in the following counties:—Hampshire, Surrey, Kent, Berkshire, Buckinghamshire, Middlesex, and Hertfordshire. It is of the utmost importance that this disease, which is apparently of an especially infectious and incurable nature, should not be allowed to extend to this country. Bee-keepers are, therefore, warned not to purchase or obtain bees or secondhand bee-keeping appliances from Great Britain unless from districts in which it is known that disease does not exist.

CONFERENCE ON THE POULTRY INDUSTRY.

An important Conference on matters connected with the development and improvement of the Poultry and Egg Industry of the United Kingdom is being convened by the Department of Agriculture and Technical Instruction for Ireland, and will be held in Dublin at an early date. The need for developing and improving, without delay, the home production of these important food supplies has been especially emphasised by the marked decline within recent years in the volume of the imports into the United Kingdom of eggs and poultry from the Colonies and foreign countries. This decrease, which is likely to be continued, and which is, to a large extent,

responsible for the increased cost of these commodities, is due to greater consumption in almost every European country, and especially in Germany, which now imports larger quantities of eggs and poultry than any other country in the world, and is tapping sources upon which the British Markets formerly depended to a considerable extent.

The decline in the volume of foreign supplies has been, in some measure, met by increased supplies from Ireland, where very great progress has been and is being made in the development of this important industry. Ireland now holds first place as supplier of eggs and poultry to Great Britain, the total value of its trade in these commodities now averaging over £3,600,000 per annum. The Department of Agriculture have, during recent years, devoted a great deal of attention towards improving the quality and quantity of the produce at home, and the methods of packing and marketing, and have been active in protecting the trade against the fraudulent competition of stale and dirty foreign eggs with the clean, well-packed and graded and fresh Irish article. The various bodies and associations interested in the well-being of the industry in the United Kingdom are, therefore, looking to Ireland to take the lead in a general movement for the further development of the poultry industry in all sections, so that, not only may an impetus be given to a great agricultural industry, but the country may be less dependent than heretofore upon foreign supplies. Representations have been made to the Department that, in view of the great progress recently made and the importance of the industry in Ireland, Dublin would be the most fitting centre for the holding of a Conference on the matter.

The Department have, accordingly, arranged to invite representatives of the various bodies and organisations in Great Britain and Ireland, interested in the development of the industry, to meet in Dublin on the 4th and 5th of May this year, for the purpose of discussing the question and the steps to be taken in regard to education, improvement of production, marketing and disposal of produce, organisation, etc. All enquiries or communications on the subject of the Conference should be addressed to the Secretary of the Department of Agriculture and Technical Instruction, Upper Merrion Street, Dublin.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

(AGRICULTURAL BRANCH.)

VALUE OF ARTIFICIAL MANURES, 1911.

The following Unit Prices have been fixed by the Department for use in comparing the approximate commercial values of manures this season:—

Nitrogen	...	...	...	15/-	per Unit.
Phosphate, soluble in water	...	...	...	1/10	"
*Phosphates, soluble in Citric Acid	...	...	...	1/4	"
†Bone Phosphate	...	...	...
Potash	...	...	...	4/6	"

These Units are based on the present retail cash prices of manures in Dublin and Belfast. When these units are multiplied by the respective percentages, if any, in the analysis of a manure, and 10/- is added for mixing, the result will represent very nearly the *cash price* of one ton of the manure free on rail at Dublin or Belfast. To ascertain the corresponding price at any other place in Ireland, add the amount shown in the list inside.

No one need pay more than these prices, and, in some instances, manures can be bought at something less; especially is this the case where farmers combine to bulk their orders, or where they buy the ingredients and mix for themselves.

STATEMENT showing the amount which must be added to the Price of Manures in Dublin or Belfast to represent the cost of the same Manures at the following places when purchased from a local merchant or in quantity direct from the manufacturers:—

A.				B.	
	Per Ton.		Per Ton.		Per Ton.
Abbeydorney	8/9	Askeaton	9/-	Ballinamore	8/6
Abbeyfeale	11/-	Athboy	5/6	(Donegal).	
Abbeyleix	7/9	Athenry	8/9	Ballinasloe	6/-
Adhill	10/9	Athlone	7/-	Ballinasloe	8/-
Adare	9/-	Athy	5/6	Ballinass	7/6
Acoon	9/-	Attanagh	7/9	Ballincollig	3/-
Aghada	3/9	Attymon	9/9	Ballinderry	3/3
Aghadowey	5/3	Augher	8/-	Ballindine	10/9
Aghalee	3/9	Aughnacloy	7/6	Ballindrait	4/9
Aldergrove	4/3	Aughrim (Wicklow)	4/9	Ballineen	6/-
Annaghmore	5/-	Aunascaul	10/6	Ballingen	5/6
Antrim	3/9	Aylward's Town	3/3	Ballingrane	9/3
Ardagh	9/9			Ballinhassig	3/3
Ardara Road	10/9			Ballinlough	10/2
Ardee	4/6			Ballinrobe	10/9
Ardfert	8/3	Bagnalstown	7/9	Ballintogher	9/-
Ardglass	5/-	Balbriggan	4/-	Ballintra	8/9
Ardrahan	10/9	Balla	9/9	Ballybay	5/9
Ardsoil	10/3	Ballaghaderreen	10/3	Ballybeg	5/3
Arigna	10/9	Ballina	6/3	Ballybofey	7/9
Arklow	5/-	Ballinahinch	12/-	(Stranorlar).	
Armagh	5/3	(Co. Galway).		Ballyboley	5/6
Armoyle	6/6	Ballinamallard	8/6	Ballybrophy	6/3
Arva Road	8/6	Ballinamore	10/-	Ballybunion	11/3

* The Unit Value of Citric Soluble Phosphate in Basic Slag is 1s. 9d.

† No allowance should be made for Insoluble Phosphates unless from Bone.

	Per Ton.		Per Ton.		Per Ton.
Ballycar	9/9	Blarney	2/9	Castlerook	4/9
Ballycarry	3/9	Blessington	3/3	Castletown	6 9-
Ballycastle (Antrim)	6/3	Boher	8/9	Castletownberehaven	8/9
Ballyclare	2/6	Borris	7/-	Castletownroshe	6/-
Ballyclare June.	3/-	Boyle	9/6	Castlewellan	5 3
Ballyconnell	9/6	Bray	2/3	Cavan	8 6
Ballycullane	4/6	Bridge End	3/3	Celbridge	2/9
Ballycumber	7/3	Bridgetown(D'gal)	8/9	Chapel	4/6
Ballydehob	8/6	Bridgetown(W'ford)	5/3	Charlemont	5/3
Ballyduff (Cork)	6/6	Brittas	2/9	Charlestown	11/-
Ballygawley	7/9	Brookeboro'	9/-	Charleville	6/9
Ballyglunin	10/-	Brookmount	2/9	Church Cross	9/9
Ballygowan	2/3	Bruckless	10/6	Church Hill	5/9
Ballyhack	3/9	Bruree	7/3	Clady	4/9
Ballyhaise	8/-	Bunbeg	7/6	Clara	7/3
Ballyhale	4/9	Buncrana	4/3	Clara Castle	8/9
Ballyhaunis	10/3	Bundoran	10/-	Claremorris	10/9
Ballyhooley	6/3	Bundoran June.	8/3	Clashganny	6/-
Ballyliffin	5/9	Burnfoot	3/3	Clifden	11/3
Ballymagan	4/6	Burtonport	6/6	Cloghan	7/6
Ballymagorry	4/-	Bush	4/-	Clogher	8/3
Ballymartle	4/-	Buttevant	6/-	Cloghroe	3/3
Ballymena	5/-			Clonakilty	6/3
Ballymoe	9/9	C.		Clonakilty June.	5/6
Ballymoney	4/3	Cahir	7/-	Clondulane	6/-
Ballymote	9/-	Cahiroiveen	10/-	Clones	7/-
Ballynahinch	4/-	Caledon and Tynan	6/3	Clonmany	5/-
(Co. Down).		Camolin	5/-	Clonmel	4/9
Ballynahinch June.	3/3	Campile	3/3	Clonsilla	1/9
(Co. Down).		Cape Castle	7/-	Cloughjordan	8/-
Ballynashee	7/3	Cappagh	6/9	Coachford	4/-
Ballynoe	5/3	Cappoquin	7/3	Coachford June.	3/-
Ballynure	5/9	Caragh Lake	11/-	Coagh(via Moneymore)	7/3
Ballyragget	7/6	Carberry	5/3	Coalisland	6/6
Ballyroney	5/3	Cargan	9/3	Colbinstown	5/6
Ballyshannon	8/9	Carlingford	5/-	Colebrook	10/9
Ballysodare,	7/6	Carlow	7/-	Coleraine	2/6
Ballyvary	9/3	Carndonagh	6/-	Collooney	7/0
Ballyward	5/3	Carriekfergus	2/3	Comber	2/0
Ballywillan	7/9	Carriekhue	3/9	Convoy	5/6
Ballywilliam	5/6	Carriekmacross	4/6	Cookstown	7/3
Baltimore	8/9	Carriekmore	7/3	Cookstown June.	4/9
Baltinglass	6/-	Carriek-on-Shannon	8/6	Cootehill	6/6
Banagher	7/9	Carriek-on-Suir	4/6	Corbally	3/9
Banbridge	4/3	Carrigaline	3/9	Corbet	4/9
Bandon	5/-	Carrigaloe	4/-	Cork	1/3
Bangor (Down)	2/6	Carrigans	4/-	Corofin	10/6
Bansha	8/-	Carrigrohane	2/9	Courtmaacsherry	5/-
Banteer	6/6	Carrigtwohill	3/9	Courtwood	5/3
Bantry	7/6	Carroll's Cross	4/3	Craigavad	2/-
Barnagh,	10/6	Carrowen	4/-	Cratloe	9/6
Batterstown	3/3	Carrowmore	9/6	Craughwell	10/-
Bawnboy	10/9	Cashel	9/6	Cresslough	6/6
Beauparc	4/-	Cashelnagore	6/6	Crew	7/6
Beotive	4/9	Castlebar	8/6	Creighanroe	5/6
Belcoo	12/-	Castlebellingham	3/6	Croily	6/6
Bellarena	5/-	Castleblayney	5/-	Crockstown Road	4/6
Belleek	10/-	Castlecaldwell	9/9	Croom	8/0
Bellurgan	4/-	Castleconnell	9/-	Crossedoney	8/3
Belmont	6/6	Castledawson	6/3	Crossagar	4/-
Belmullet	10/-	Castlederg,	7/-	Crosshaven	4/3
Belturbet	8/3	Castlefinn	5/-	Crossroads	8/9
Bennet's Bridge	5/9	Castlegregory	9/9	Crumlin	4/-
Beragh	7/3	Castlegregory June.	9/-	Crusheen	11/3
Bessbrook	4/9	Castlegrove	11/-	Cullion	3/-
Birdhill	9/6	Castleisland	9/3	Culloville	4/3
Blackrock (Cork)	3/3	Castlemaine	10/-	Cullybackey	5/9
Blackwatertown	5/6	Castlereas	9/9	Culmore	1/3

	Per Ton.		Per Ton.		Per Ton.
Currabiny	4/3	Edgeworthstown	7/6	Gweedore	6/6
Curry	10/6	Eglinton	3/-		
		Embankment	1/6	H	
D.		Emly	8/3	Hamilton's Bawn	6/-
Dalkey	3/-	Emyvale Road	7/-	Harristown	4/6
Delgany	3/3	Enfield	4/6	Haulbowline	4/-
Derryork	5/9	Ennis	8/9	Hazelhatch	2/9
Dervock	5/9	Enniscorthy	2/6	Headford Junc.	8/6
Desert	5/9	Enniskillen	8/9	Headwood	7/3
Desertmartin	6/9	Ennistymon	12/6	Healy's Bridge	2/9
Devon Road	11/-			Helen's Bay,	2/6
Dingle	8/9	F.		Hilden Siding	1/9
Doagh	2/6	Fahan	3/9	Hill of Down	5/6
Donabate	3/-	Falcarragh	6/6	Hillsborough	3/-
Donaghadee	2/9	Farranaleen	6/6	Hollyhill	10/-
Donaghmore	6/3	Farranfore	9/-	Hollymount	11/-
Donamon	9/6	Farrangalway	4/6	Hollywood	1/6
Donegal	8/9	Fenit	7/6	Horse & Jockey	7/3
Donemana	3/-	Ferbane	6/9	Horseleap	7/3
Donoughmore	4/-	Fermoy	5/9	Howth	2/9
Doonbeg	12/9	Ferns	3/9		
Dooniskey	4/9	Fethard	6/6	I.	
Dooran Road	9/9	Fiddown	4/-	Inch	5/3
Downhill	5/-	Fintona	7/-	Inch Road	3/3
Downpatrick	4/3	Fintown	8/-	Inniskeen	3/3
Draperstown	7/3	Firmount	4/-	Inver	9/9
Drimoleague	7/6	Fivemiletown	8/6	Irvinestown	8/6
Dripsey	3/9	Float	7/6		
Drogheda	1/3	Florencecourt	11/9	J	
Dromahair	9/-	Foxford	8/-	Jordanstown	2/3
Dromineer	7/3	Foxhall	6/3		
Dromkeen	9/3	Fox's Bridge	3/9	K	
Dromod	7/-	Foynes	10/-	Kanturk	6/9
Dromore (Down)	3/9			Katesbridge	5/-
Dromore Road	7/9	G		Keady	6/-
Drumfries	5/-	Galway	6/3	Kells (Ballymena)	8/6
Drumree	3/6	Garvagh	5/3	Kells (Meath)	5/9
Drumshambo	10/9	Geashill	7/-	Kells (Kerry)	13/-
Drumsna	9/-	Gibbstown	5/3	Kellswater	5/-
Drumsurr.	5/3	Glanworth	6/0	Kenmare	7/3
Duleek	3/9	Glarryford	6/3	Kesh	9/-
Dunadry	3/9	Glasslough	6/6	Kilbeggan	7/6
Dunboyne	2/6	Glenavy	3/9	Kilcock	3/6
Duncannon	3/9	Glenbeigh	11/3	Kilcoe	10/3
Duncoormack	5/6	Glenealy	3/3	Kilcool	3/3
Dundalk or Dundalk Junc.	1/3	Glenfarne	11/6	Kilcrea	3/9
		Glen Garriffe	8/6	Kildare	5/-
Dundrum (Down)	5/-	Glenmaquin	5/6	Kildysart	10/6
Dundrum (Dublin)	2/-	Glenmore	7/3	Kilgarvan (Kerry)	9/6
Dundrum (Tipperary)	9/-	Glienties	8/6	Kilgarvan (Tipperary)	7/9
Dunfanaghy	7/6	Glin (Kerry)	11/3	Kilkee	12/6
Dunfanaghy Rd.	6/6	Glynn	4/6	Kilkenny	6/3
Dungannon	5/9	Goold's Cross	9/-	Killagan	6/3
Dungarvan	5/-	Goraghtwood	4/6	Killala	7/9
Dungiven	5/9	Goresbridge	7/6	Killaloe	8/9
Dungloe Road	6/6	Gorey	4/9	Killarney	9/-
Dunkineely	10/3	Gormanstown	4/-	Killeagh	5/3
Dunlavin	5/3	Gort	11/3	Killeshandra	8/9
Dunleer	4/-	Gortalea	8/9	Killinick	4/9
Dunloy	6/3	Gowran	7/-	Killorglin	10/-
Dunmanway	6/9	Graigue	5/6	Killough	5/-
Dunsandle	9/9	Grange	3/9	Killucan	6/-
Durrow	5/6	Grange Con	5/9	Killumney	3/3
Durrus Road	8/3	Greencastle	1/9	Killybegs	4/6
		Greenisland	2/6	Killygordon	5/-
E.		Greenore	4/3	Killylea	5/9
Edenderry	4/-	Greystones	3/3	Kilmacow	3/3
Edermine Ferry	5/6	Groomsport	3/-		

	Per Ton.		Per Ton.		Per Ton.
Kilmacrennan ..	6/9	Maefin Junc. ..	4/6	Newport Trench ..	4/3
Kilmaethomas ..	4/6	Maemine Junc. ..	5/3	New Ross ..	2/6
Kilmainham Wood ..	6/3	Macroom ..	5/3	Newry ..	2/6
Kilmallock ..	7/6	Madore ..	8/3	Newtownards ..	2/-
Kilmeaden ..	3/9	Magney ..	66/-	Newtownbutler ..	7/6
Kilmessan ..	4/3	Maghera ..	7/3	Newtowncunningham ..	4/-
Kilmorna ..	10/9	Magherafelt ..	6/6	Newtownforbes ..	8/3
Kilmurry (Cork) ..	3/9	Magheramorne ..	4/3	Newtownstewart ..	5/9
Kilmurry (Clare) ..	13/3	Magilligan ..	5/3	Nobber ..	6/-
Kilrane ..	3/9	Maguiresbridge ..	8/6		
Kilrea ..	5/9	Malahide ..	2/-		O
Kilroot ..	3/-	Malin Head ..	3/9	O'Brien's Bridge ..	9/9
Kilrush ..	10/-	Mallaranny ..	9/9	Oldcastle ..	7/-
Kilsheelan ..	5/6	Mallow ..	5/6	Omagh ..	6/6
Kiltimagh ..	11/6	Manorcunningham ..	5/-	Omeath ..	5/3
Kilscourt ..	6/6	Manorhamilton ..	10/9	Oola ..	9/-
Kinsale ..	5/-	Markethill ..	5/6	Oranmore ..	7/6
Kinsale Junction ..	4/-	Maryboro' ..	6/3	Oughterard ..	9/3
Knockanally ..	6/9	Maynooth ..	3/-	Ovoca ..	4/3
Knockcroghery ..	9/-	Midleton ..	3/3		P
Knocklong ..	8/-	Middletown (Armagh) ..	5/9	Palace East ..	4/6
Knockloughrim ..	6/9	Milford (Carlow) ..	7/3	Pallas ..	9/3
Kylemore ..	8/-	Milford (Donegal) ..	7/6	Parkmore ..	8/-
		Millstreet ..	7/3	Parsonstown ..	7/3
	L	Milltown (Tuam) ..	10/6	Passage West ..	3/9
Laffan's Bridge ..	7/-	Milltown-Malbay ..	13/3	Patrickswell ..	8/9
Laghey ..	8/9	Mitchelstown ..	6/9	Peake ..	4/-
Lanesborough ..	8/-	Moate ..	7/6	Pettigo ..	9/3
Larne ..	4/3	Mogeely ..	4/6	Philistown ..	5/9
Larne Harbour ..	4/6	Mohill ..	9/-	Pluck ..	5/6
Laurecetown ..	4/6	Moirs ..	3/6	Pomeroy ..	6/9
Laytown ..	3/9	Molahiffe ..	9/6	Portadown ..	3/9
Leighlinbridge ..	7/9	Monaghan ..	6/3	Portarlinton ..	5/-
Leitrim ..	5/3	Monaghan Road ..	6/3	Porthall ..	4/-
Leixlip ..	2/6	Monasterevan ..	4/9	Portrush ..	2/6
Letterkenney ..	5/6	Moneymore ..	7/-	Portsalon ..	7/6
Levittstown ..	6/-	Monkstown (Cork) ..	3/9	Portstewart ..	4/3
Leyney ..	9/3	Moorefields ..	8/-	Portumna ..	8/3
Limavady ..	4/6	Morley's Bridge ..	9/3	Poulaphouca ..	4/-
Limavady Junc. ..	4/3	Mountain Stage ..	12/6	Poyntzpass ..	5/3
Limerick ..	6/3	Mountcharles ..	8/9		Q
Lisbellaw Junc. ..	7/6	Mountmellick ..	6/3	Queenstown ..	4/3
Limerick ..	8/6	Mountrath ..	7/9	Queenstown Junc. ..	3/6
Lisburn ..	1/9	Mountshannon ..	9/9	Quilty ..	13/6
Lisecoley ..	5/6	Mourne Abbey ..	4/9	Quin ..	10/3
Lisduff ..	8/9	Moville ..	3/9		R
Liseldon ..	13/3	Moy ..	5/3	Raffeen ..	3/9
Lismore ..	7/3	Moyasta ..	12/3	Rahan ..	6/3
Lisnagry ..	9/-	Moycullen ..	7/9	Ramelton ..	6/-
Lisnakea ..	8/-	Muckamore ..	4/3	Randalstown ..	4/9
Lispole ..	10/9	Mullafarnaghan ..	4/-	Raphoe ..	5/3
Listowel ..	10/3	Mullinavatt ..	3/9	Rathangan ..	5/3
Lixnaw ..	9/6	Mullingar ..	6/3	Rathdrum ..	3/-
Lombardstown ..	6/-	Mulroy ..	7/6	Rathduff ..	4/-
Londonderry ..	1/3	Multyfarnham ..	6/9	Rathfriland ..	8/9
Longford ..	8/-		N	Rathkeale ..	9/6
Loo Bridge ..	9/-	Naas ..	3/6	Rathmore ..	8/-
Loughgilly ..	5/3	Navan ..	3/9	Rathmullan ..	6/-
Loughmeala ..	10/-	Nenagh ..	7/3	Rathnew ..	3/3
Loughrea ..	10/-	Newbliss ..	6/9	Rathvilly ..	6/3
Lowtown ..	4/3	Newbridge ..	4/3	Recess ..	11/6
Lucan ..	2/6	Newbuildings ..	3/3	Redhills ..	8/-
Lurgan ..	3/9	Newcastle (Down) ..	5/-	Retreat ..	9/9
Lusk ..	3/3	Newcastle West ..	10/-	Rhoda Bridge ..	4/-
Luska ..	7/3	Newcastle (Wicklow) ..	3/6	Rich Hill ..	5/-
	M	Newmarket (Cork) ..	7/3		
Maam Cross ..	10/9	Newport (Mayo) ..	7/9		

	Per Ton.		Per Ton.		Per Ton.
Ringaskiddy ..	4/-	Smithborough ..	7/9	Tubbercurry ..	9/6
Robertstown ..	4/3	Sneam ..	8/9	Tullamore ..	5/9
Rochestown ..	3/3	Spa ..	8/6	Tullow ..	7/-
Rockcorry ..	6/3	Sparrowsland Sdg... 4/6	4/6	Tullymurry ..	5/-
Rooskey ..	7/-	Staffordstown ..	5/6	Tynan ..	6/3
Rosecommon ..	9/6	Stewartstown ..	6/3		
Roscrea ..	8/6	Strabane ..	3/3		U
Ross ..	9/-	Stranocum ..	6/-	Upperlands ..	7/3
Rosslare ..	5/-	Stranorlar ..	6/-	Upton ..	4/-
Rossmore ..	8/3	Streamstown ..	7/3		
Rossnowlagh ..	10/-	Swinford ..	11/6		V
Rush and Lusk ..	3/3			Valentia Harbour ..	10/-
Rushbrook ..	4/-			Vernersbridge ..	5/3
				Vicarstown ..	6/-
	S		T	Victoria Bridge ..	5/3
St. Anne's ..	2/9	Tallaght ..	1/-	Virginia Road ..	6/6
Saintfield ..	2/9	Tallow Road ..	6/9		
St. Johnston ..	3/3	Tandragee ..	4/6		W
St. Mullins ..	5/6	Tarbert ..	10/-	Warrenpoint ..	4/3
Sallins ..	3/6	Templemore ..	6/3	Waterfall ..	3/3
Sallybrook ..	4/9	Templepatrick ..	3/9	Waterford ..	1/3
Scariff ..	9/6	The Lamb ..	2/9	Wellington Bridge ..	5/-
Scarva ..	5/3	Thomastown ..	5/6	Westport ..	6/3
Schull ..	8/6	Thurles ..	6/9	Westport Quay ..	6/3
Shankill ..	2/6	Timoleague ..	5/9	Wexford ..	2/6
Shannon Bridge ..	8/-	Tinahely ..	5/6	Whiteabbey ..	2/-
Shannon Harbour ..	6/6	Tipperary ..	8/3	Whitehead ..	3/6
Shillelagh ..	6/-	Toome Bridge ..	5/9	Wicklow ..	1/3
Sionmills ..	5/-	Tower Bridge ..	2/9	Wilkinstown ..	5/6
Sixmilebridge ..	9/6	Tralee ..	6/3	Woodenbridge ..	4/9
Sixmilecross ..	7/6	Tramore ..	2/9	Woodlawn ..	9/6
Skerries ..	3/9	Trew & Moy ..	5/6		
Skibbereen ..	8/3	Trillick ..	8/-		Y
Sligo ..	6/3	Trim ..	5/-	Youghal ..	5/-
		Tuam ..	10/6		
		Tubber ..	11/9		

The following are examples showing how manures may be valued by means of the Unit Prices given in these pages:—

1. Suppose the manure is guaranteed to contain "3.25 per cent. Nitrogen, 23 per cent. Soluble Phosphates, 8 per cent. Potash," its value at Ballybay would be reckoned thus:—

Nitrogen	...	3.25 per cent. @ 15/- per Unit	=	2	8	9
Soluble Phosphates	23	" @ 1/10 "	=	2	2	2
Potash	...	8 " @ 4/6 "	=	1	16	0
Allowance for Mixing	...	...	=	0	10	0
*Special Allowance for Ballybay (see Statement)			=	0	5	9

Value per ton at Ballybay ... £7 2 8

2. Suppose the guaranteed analysis is "19 per cent. Soluble Phosphates, 1.5 per cent. Potash, 2.45 per cent. Nitrogen," the value of the manure at Tralee would be reckoned thus:—

Soluble Phosphates	19 per cent.	@ 1/10 per Unit	=	£	s.	d.
Potash	1.5 "	@ 4/6 "	=	0	6	9
Nitrogen	2.45 "	@ 15/- "	=	1	16	9
Allowance for Mixing	...	...	=	0	10	0
Special Allowance for Tralee (see Statement)			=	0	6	3

Value per ton at Tralee ... £4 14 7

Farmers are advised to consult their County Agricultural Instructor before buying any manure if they are in doubt as to its value.
January, 1911.

8122/10.—CIRCULAR.

DEPARTMENT OF AGRICULTURE
AND TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET,

DUBLIN, *January, 1911.*

TO DAIRY FARMERS, CREAMERY PROPRIETORS AND
MANAGERS, AND OTHERS CONCERNED IN THE
IRISH DAIRYING INDUSTRY.

GENTLEMEN,

I have to transmit, for your information, the accompanying copy of the Department's Scheme No. 20, for encouraging improvement in the Dairy Cattle of Ireland, and to direct your attention in particular to the proposals embodied in Clauses 9 and 10. The practical utility of a system under which farmers keep a record of the milk yield of their cows has been fully recognised in countries which are Ireland's most serious competitors in the Dairying Industry.

In the first place, a system of this kind is of direct personal advantage to every dairy farmer, because it enables him to ascertain the value of each of his cows as a milk producer, and thus shows him the animals he should reject from his herd and those which he should retain. The cost of feeding is the same for a poor milker as for a good milker.

The results of an increase in the price of butter and of an increase in the milk yield may be compared as follows:—

An increase in the price of butter of 9s. 4d. per cwt., or 1d. per lb., would mean an increased return of 18s. 4d. for every cow yielding 500 gallons of milk per year.

An increase of 100 gallons in the annual milk yield per cow would mean, at 4½d. per gallon, an increased return of £1 17s. 6d. per cow for the year.

In the second place, if individual farmers are able to secure a greater yield of milk than heretofore from the same number of cows, the advantage to the creamery follows as a natural consequence, for its supply of milk will be increased without any increase in the number of suppliers, and there will thus be a reduction in the working expenses per cwt. of butter. The advantage of an increased supply of milk without any addition to the existing number of suppliers will be more especially appreciated in those districts in which creameries are numerous. In the circumstances, the Department, while not suggesting that efforts to improve the selling price of a creamery's output, should be relaxed, ask proprietors and managers to consider seriously the adoption of a system of cow testing among their milk suppliers.

The conditions to be complied with are simple. All that is necessary is to weigh and to record the weight of the milk of each cow on one day in each week at the morning and evening milkings, to take a sample of the milk weighed, and to have the composite samples tested at the end of each month. In the case of milk suppliers to a creamery, it is recommended that the manager should carry out the monthly tests, and should take upon himself such general supervision of the working of the system as may be necessary to secure that the weighing and the recording of the milk yield is regularly and accurately carried out. In such cases the creamery manager

would be the "Secretary" referred to in Clause 9 (III.) of the Scheme, and would, therefore, be entitled to the grant of 1d. per cow per month, which the Department propose to make in a limited number of instances in order to encourage the introduction of systematic cow-testing. This grant is not to be regarded as a permanent one or as indicating the Department's opinion as to what would be a suitable or adequate remuneration for the work to be done. The amount of such remuneration should depend upon the circumstances of each case, and should be contributed by those whose cows are tested. The knowledge gained by the farmer and the increased monetary return resulting from the proper use of such information will more than recoup him for his contribution.

The arrangements under Clause 9 (IV.) for the inspection of cows which give a yield of not less than 500 gallons of milk with an average butter-fat percentage of not less than 3.5, should help farmers to obtain the registration of suitable cows under the scheme. Among the advantages to be derived from such registration are the following:

1. The registration of dairy cows should enhance their value.
2. The bull calves by pure-bred bulls, or registered dairy bulls, are eligible for premiums (see Cattle Breeding Scheme, 1911, Clauses 11 and 13).
3. The heifer calves may be reared for home use or, if sold, should realise a higher price on account of their being bred from a dam whose milk yield has been tested and found satisfactory.

The Department have decided to extend to the 31st January, 1911, the period during which applications may be made under Clause 10 of the scheme for the present year.

I am,

Gentlemen,

Your obedient Servant,

T. P. GILL,
Secretary.

SCHEME No. 20.

SCHEME FOR ENCOURAGING IMPROVEMENTS IN THE DAIRY CATTLE OF IRELAND THROUGH THE SELECTION AND REGISTRATION OF COWS.

Dairying, as well as the raising of store cattle, is one of the principal branches of agriculture pursued in this country. It is, accordingly, of importance that the milking properties of Irish cattle should be preserved and improved. In dairy herds the yield and quality of milk given by each cow largely determine whether that animal realises a profit or entails a loss to the owner; consequently it is essential that farmers should know exactly the quantity and quality of milk which each cow yields per annum. At the same time, as young cattle are a considerable source of revenue, it is desirable that the good milking cow should be of the type likely to produce a calf which will be of value for both beef and milk. With the object of encouraging the improvement of Irish dairy cattle, the Department have decided to put into operation the following scheme:—

1. The Department will keep a register of dairy cattle in which cows and their produce may be entered, subject to the provisions of this scheme. The inspection of cows with a view to entry on this register will be carried out by the Department.

INDIVIDUAL OWNERS.

2. Owners of good cross-bred and pure-bred dairy cows are invited to apply on the prescribed form for the inspection of their stock by the Department as regards:—

- (a) General merit (*i.e.*, appearance), and
- (b) Milk yield.

Only cows of a distinct and well-defined type are eligible.

3. Applications for the inspection of cows must be lodged with the Department on the prescribed form on or before the 31st August each year, and must be accompanied by a fee of 2s. 6d. in respect of each cow entered for inspection.

As soon as all applications have been received, the Department will give due notice to each cow owner of the centre fixed for inspection of his animals.

Cow owners presenting animals for inspection will be refunded all fees paid by them except in respect of cows which are provisionally selected for registration under Clause 4.

4. Cows will be provisionally selected, on the ground of general merit, at local shows, local exhibitions, or at such other convenient centres as may be determined by the Department.

With regard to inspections elsewhere than at local shows, it should be understood that the Department, save in exceptional cases, cannot undertake to send an Inspector to any district unless at least ten cows from such district are offered for inspection.

All animals provisionally selected for general merit under this scheme will be suitably marked by the Department for future identification.

Provisionally Selected Cows.

5. Owners of cows provisionally selected under Clause 4, are required to observe the following conditions:—

- (a) To provide themselves with an approved type of machine for weighing milk;
- (b) To weigh the milk yielded by each cow on every seventh day during the entire milking period (the exact day of the week for each herd will be fixed by the Department), and to record the same on the form provided for the purpose;
- (c) To permit their herds to be inspected by the Department at any time; and
- (d) To afford the Department every facility for examining the milk records and for taking samples of the milk of each selected animal.

6. The records kept under Clause 5 (b) shall be forwarded to the Department when required. This will, usually, be at the end of the year following that in which the cows were provisionally selected.

7. As soon as possible after the receipt of these records, the Department will notify to each owner of a provisionally selected cow their decision as to the registration or rejection of the animal.

8. If the owner of a provisionally selected cow complies with the requirements of Clause 11, and if the cow is subsequently accepted for entry in the Department's register, particulars of the progeny with regard to which the necessary certificates have been furnished prior to the registration of the dam, will be duly recorded in the register, and such progeny will be entitled to the same benefits as if calved after the registration of the dam.

COW TESTING ASSOCIATIONS.

9. The following regulations apply to Cow Testing Associations only:—

(I.) A cow testing association formed for the purpose of this scheme may be composed either of members of existing agricultural and dairy societies or of farmers combining specially for the purpose, who will undertake to comply with the following conditions:—

- (a) The association shall secure an entry of as many herds of milking cows as possible, each member of the association being required to enter all his cows.
- (b) The members shall have the milk of each cow weighed on every seventh day (the exact day of the week being fixed by the association). The morning and evening milk shall be weighed, and recorded separately on the form prescribed for the purpose.
- (c) After every weighing a sample of each cow's milk must be taken and preserved until the end of the month, when the composite sample for the month shall be tested for butter-fat.
- (d) The association shall appoint a secretary, whose duties shall be: (i.) to transfer the weekly records to the "monthly summary" book provided for the purpose; (ii.) to ensure that the monthly butter-fat tests are regularly carried out, and (iii.) to record the results of these tests in the monthly summary book.
- (e) The record sheets, monthly summary book, list of members of the associations, &c., must be open to inspection by the Department at any time.

(II.) When the Department are satisfied that a cow testing association has been formed, and that suitable arrangements have been made to comply with the foregoing requirements, they will be prepared to supply the society with the necessary number of byre record sheets and monthly summary books.

(III.) If the number of cows for which records are being kept exceeds fifty, the Department will (in a limited number of cases) be prepared for at least one year to make a grant to the secretary at the rate of one penny per cow per month towards the cost of testing the milk for butter-fat.

(IV.) The Department will be prepared to inspect all cows which have given, during the milking period covered by the records, a yield of not less than 500 gallons of milk with an average butter-fat percentage of 3.5, and to accept for entry in the Registry of Dairy Cattle, on payment of a fee of 2s. 6d. for each cow, all animals of good conformation and well defined type.

10. Applications in regard to proposed cow testing associations will be dealt with in the order in which they are received, and should be forwarded to the Department not later than 31st October.

Registered Cows.

11. The owner of each registered cow must comply with the following conditions:—

- (a) To have the animal served by a registered dairy bull or a pure-bred bull of her own type. These bulls must be passed by the Department as eligible for a premium.

[Persons who intend eventually to enter the progeny of registered cows in the herdbooks of their respective breeds must have the cows served by pure-bred bulls. N.B.—A registered dairy bull may be pure-bred.]

- (b) To forward on the prescribed form a certificate of service to the Department within three months from the date of such service;
- (c) To furnish to the Department on the prescribed form, within seven days from the date of birth, particulars regarding sex, colour, markings, &c., of each calf produced by a registered cow; and,
- (d) To keep on the prescribed form a record of the breeding, date of birth, &c., of produce, for the purposes of future registration.

12. The female progeny from the service of registered cows by bulls approved under Clause 11 (a) will be eligible for inspection at or about two years old, at a fee of 2s. 6d. each.

13. When a registered cow or her calf has been disposed of, the Department must be notified of the fact within fourteen days of the disposal of the animal, and at the same time advised of the name and address of the new owner.

The death of a registered cow or her calf must also be notified to the Department within fourteen days of the death of the animal.

14. In all cases of dispute in matters connected with this scheme the decision of the Department shall be final.

II.—TECHNICAL INSTRUCTION.

FORM S. 106.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND,

UPPER MERRION STREET, DUBLIN.

SPECIAL EXAMINATIONS IN ELEMENTARY MODELLING AND IN DRAWING ON THE BLACKBOARD.

The Department will hold in October and November, 1911, Special Examinations in Elementary Modelling and in Drawing on the Blackboard for Candidates for the Irish Secondary Teachers' Drawing Certificate. The tests in these subjects are provided only for such candidates, and the Department will not be prepared to admit applicants who have not previously obtained at least three of the other successes required for the certificate.

Should a sufficient number of applications be received, arrangements will be made to hold Examinations in Dublin, Belfast, Cork, Londonderry, Limerick, Waterford, and Galway.

Applications for admission to the Examinations must be submitted not later than the 15th September, on Form S. 117 in the case of the Elementary Modelling, and on Form S. 119 in the case of Drawing on the Blackboard. Copies of these forms may be obtained, after the 15th August, from the Offices of the Department.

The Department have not fixed any fee to be paid by Candidates, but the Managers of the schools at which the Examinations will be conducted will be at liberty to charge each applicant a fee not exceeding 2s. 6d.

Memo. No. 26.

T.I.B.

NOTICE OF CHANGE IN OFFICIAL CALENDAR, 1911.

Owing to the incidence of the King's Coronation and the Feast of SS. Peter and Paul, the Intermediate Examinations will not terminate until Friday, the 30th June, 1911, and it is, therefore, necessary to make an alteration in the Time-table of the examination for Science and Technological Scholarships and Teacherships-in-Training at the Royal College of Science, Dublin. The examination will be held on the days and at the hours shown below :—

Monday, 3rd July.—Experimental Science (Practical Examination), 10 a.m.-1 p.m. ; Drawing, 2 p.m.-5.10 p.m.

Tuesday, 4th July.—Mathematics (First Paper), 10 a.m.-1 p.m. ; Experimental Science (Written Examination), 2 p.m.-5 p.m.

Wednesday, 5th July.—Mathematics (Second Paper), 10 a.m.-1 p.m. ; English, 2 p.m.-5 p.m.

Thursday, 6th July.—Greek, Latin, Irish, French or German, 10 a.m.-1 p.m.

No change will be made in the date announced for the opening of the Summer Courses of Instruction for Teachers.

UPPER MERRION STREET,
DUBLIN, April, 1911.

SIR, OR MADAM,

I have to enclose herewith a copy of the Department's Programme of Experimental Science, Drawing, Manual Instruction, and Domestic Economy for Day Secondary Schools for the session 1910-11, and to inform you that the regulations set forth in this publication will not be very considerably altered for the coming school session.

Attention is directed to the official calendar affixed to the Programme, from which it will be observed that if the Managers desire the above-named school to be admitted to the list of schools working for grants under the conditions of the regulations during the academic year 1911-12, application must be made by the 1st May next.

Copies of the form of application (S. 44a.) may be obtained from the Offices of the Department.

I am,

Sir, or Madam,

Your obedient Servant,

T. P. GILL.

III.—FOOD AND DRUGS.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

BUTTER AND MARGARINE ACT, 1907.

(Sections 8 and 14 (1).)

LIST (SIXTH LIST) OF NAMES APPROVED BY THE DEPARTMENT FOR USE IN CONNECTION WITH MARGARINE.

NOTE.—Approval by the Department authorises the use of the name in Ireland only. Approval does not confer on any person any exclusive right to the use of the name, nor authorise its use by any person not entitled to use it.

Banquet	Green Star	Probono
Birch Tree	Guildhall	Sabrina
Cactus	Handmaid	Seesaw
Challenge	Hyacinth	Snodrop
Chrysanthemum	Icoline	Sovereign
Committee	Imperial Crown	State
Consumers	Jewel	Sundew
Crano	Knutal	Sycamore Tree
Crenut	Lobby	Tiger
Daffodil	Margo	Uno
Fatima	Mayco	Veeco
Gardenia	Maydew	Vegea
Garland	Mayfirm	Vegetaria
Goal	Menu	Velvina
Gold Cross	Milnut	Vendo
Golden Bloom	Nuterea	Viking
Golden Cross	Olive Tree	Walnut
Golden Crown	Palm Tree	Walrus
Golden Dew	Pasella	White Swan
Golden Eagle	Pearloma	Willow
Golden Swan	Poplar Tree	Yellow Bloom

Offices, 4 Upper Merrion Street,
Dublin, 31st December, 1910.

NOTES AND MEMORANDA.

A meeting of the Agricultural Board was held at the offices of the Department, Upper Merrion Street, Dublin, on Thursday, the 2nd March. The following were present:—The Right Hon. T. W. Russell, P.C., Vice-President of the Department, in the chair;

Agricultural Board Meeting. Mr. Robert Downes, J.P.; Col. N. T. Everard, H.M.L.; Sir Josslyn Gore-Booth, Bart., D.L.; Most Rev. John Healy, D.D., Lord Archbishop of Tuam; Most Rev. Denis Kelly, D.D., Lord Bishop of Ross; Mr. John S. F. McCance, J.P.; Mr. William McDonald, J.P.; the Right Hon. Lord Monteagle, K.P., D.L.; Mr. H. de F. Montgomery, D.L.; Mr. George Murnaghan, J.P.; Mr. P. J. O'Neill, J.P.

Mr. T. P. Gill, Secretary of the Department; Mr. J. R. Campbell, B.Sc., Assistant Secretary in respect of Agriculture; Mr. R. Cantrell, I.S.O., Chief Clerk; Mr. J. S. Gordon, B.Sc., Chief Agricultural Inspector; Mr. T. Butler, Superintendent of the Statistics and Intelligence Branch; Mr. J. D. Daly, M.A. (who acted as Secretary to the meeting); and Mr. J. V. Coyle were also present.

The Board had the following amongst other matters under consideration:—

Extension of the Department's work in connection with forestry; development of the horse-breeding schemes; veterinary dispensaries in Congested districts; proposed Bill for the improvement of the Irish dairying industry; the working of the Weeds and Agricultural Seeds (Ireland) Act and of the Fertilisers and Feeding Stuffs Act; and proposals relating to inland fisheries.

According to the "Report of Proceedings under the Fertilisers and Feeding Stuffs Act, 1906, for the year 1909-10" (Cd. 5510—1911) which has been issued recently, the Department, during the year ended 30th September, 1910, continued their investigation in regard to the condition of the trade in artificial manures and feeding stuffs in Ireland. The Itinerant Instructors in Agriculture, who act in their respective counties as the Department's official samplers, submitted, for the information of the Department, samples representative of the goods supplied or offered for sale to farmers throughout the country. Owing, however, to the onerous duties which devolve upon these officers in their capacity as Agricultural Instructors, the time at their disposal for work in connection with the Act is necessarily limited. In these circumstances, two officers.

attached to the Department's central staff, were detailed to devote their whole time for a short period during the busy season to the making of enquiries with regard to the goods supplied and to the taking of samples where necessary.

The total number of samples of manures analysed was 268, and invoices and full particulars were given in the cases of 248. Of these 172 were up to guarantee; 48 were deficient, but within the limits of error allowed by the Act, and 28 were deficient beyond these limits.

Feeding stuffs appear to be adulterated more frequently than fertilisers, as out of 125 samples invoiced with full particulars 32 were deficient within the limits allowed, and 31 were deficient beyond these limits.

Some of the facts disclosed by the Report are disquieting. It was found, for instance, that purchasers were charged 28s. per cwt. for a milk substitute worth at most 8s.; that they were paying £3 10s. per ton for a calf food containing 9.84 per cent. of fibre, £9 5s. for linseed cake meal including 35 per cent. of weed seeds, and £9 7s. 6d. per ton for an oil meal containing 30 per cent. of screenings.

In connection with the scheme for Encouraging Improvement in the Management of Creameries an examination

**Examination
for Creamery
Certificates.**

in Dairy Technology, Dairy Bacteriology, Dairy Engineering, Physical Science, and Business Methods, as applied to Creamery Management, is held annually by the Department. Certificates of having passed the examination held on the 8th, 9th, and 10th March, 1911, were awarded to the undermentioned candidates whose names are given in alphabetical order:—Mr. Patrick Joseph Clinton, Clegga, Relaghbeg, Kells, Co. Meath; Mr. Samuel Gibson, Ballyholey, Raphoe, Co. Donegal; Mr. John Looby, Ballyowen, Cashel, Co. Tipperary; Mr. Martin O'Brien, Coolbawn, Adare, Co. Limerick; Mr. Cornelius O'Connor, Clash, Athea, Co. Limerick; Mr. John Joseph Ryan, Bishopswood, Dundrum, Co. Tipperary; Mr. Patrick R. Woulfe, Crataloe West, Abbeyfeale, Co. Limerick.

Creamery Managers' Certificates were awarded to the undermentioned candidates, who, in addition to passing the examination, satisfied the Department with regard to their practical ability as Creamery Managers:—Mr. Patrick McCarthy, Manager of Bailieborough Co-operative Agricultural and Dairy Society's (Ltd.), Creamery, Bailieborough, Co. Cavan; Mr. Charles McCluskey, Manager of Springmount Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Clonmel, Co. Tipperary.

At Termonfeekin (County Louth) Petty Sessions on the 8th instant, the skipper of the s.s. "Thistle," of Liverpool, No. L.L. 64, was prosecuted by the Department of Agriculture and Technical Instruction for Ireland for illegal trawling off Clogher Head, County Louth. A fine of £25, with £14 8s. costs, was imposed.

The first of the Department's Surprise Butter Inspections for 1911 took place on 6th April. The number of creameries dealt with was forty-two. The following creameries had the best results:—Irvinestown Co-operative Agricultural and Dairy Society, Kilmacow Co-operative Dairy Society, Scottish Co-operative Wholesale Society, Ballyvisteau Co-operative Dairy Society, Centenary Co-operative Creamery Co., Ltd.; Toomevara Co-operative Agricultural and Dairy Society, Abbeydorney Co-operative Dairy Society, Collooney Co-operative Agricultural and Dairy Society, Finn Valley Co-operative Agricultural and Dairy Society, Fivemiletown and Brookeboro' Co-operative Agricultural and Dairy Society, Lagan Co-operative Agricultural and Dairy Society. There were two judges—butter merchants of Cork and Manchester.

STATISTICAL

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

	North Coast.				East Coast.			
	1911.		1910.		1911.		1910.	
	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	—	—	—	—	37	59	62	84
Soles,	—	—	—	—	49	197	34	133
Turbot,	—	—	—	—	38	158	30	121
Total Prime Fish,	—	—	—	—	124	414	126	338
Cod,	1,461	562	915	322	2,521	1,648	1,266	1,059
Conger Eel,	—	—	—	—	424	203	494	154
Haddock,	379	153	156	61	633	448	630	477
Hake,	—	—	—	—	568	445	689	517
Herrings,	182,109	40,516	89,266	18,449	4,390	772	3,640	741
Ling,	2	1	—	—	531	212	644	154
Mackerel,	2,012	230	217	56	—	—	—	—
Plaice,	6	6	—	—	386	396	243	270
Ray or Skate,	163	39	19	5	585	211	561	141
Sprats,	—	—	—	—	—	—	—	—
Whiting,	16	7	1	1	627	507	777	529
All other except Shell Fish	146	29	205	37	456	259	600	316
Total,	186,294	41,543	90,779	18,931	11,245	5,515	9,670	4,696
SHELL FISH :—	No.	—	No.	—	No.	—	No.	—
Crabs,	—	—	720	2	—	—	194	1
Lobsters,	—	—	—	—	3,360	191	576	26
Mussels,	Cwts.	—	Cwts.	—	Cwts.	11	Cwts.	26
Oysters,	No.	—	No.	—	177	—	364	—
Other Shell Fish,	Cwts.	—	Cwts.	—	646	4	819	4
Total,	17	3	—	—	322	175	103	66
Total value of Fish landed	—	3	—	2	—	381	—	123
	—	41,546	—	18,933	—	5,896	—	4,819

NOTE.—The above figures are subject

TABLES.**IRELAND.**

as Landed on the Irish Coasts during the month of January, 1911, as corresponding period in 1910.

South Coast.				West Coast.				Total.			
1911.		1910.		1911.		1910.		1911.		1910.	
Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
2	4	1	1	4	9	—	—	43	72	63	85
12	51	13	62	61	257	31	139	122	505	78	334
—	—	1	4	22	108	10	45	60	266	41	170
14	55	15	67	87	374	41	184	225	843	182	589
51	52	31	28	279	123	177	79	4,312	2,385	2,389	1,488
—	—	—	—	121	46	47	20	545	249	541	174
26	22	44	35	1,580	1,015	317	246	2,618	1,638	1,147	819
—	—	—	—	—	—	108	44	568	445	797	561
10,545	2,466	6,331	1,498	789	253	699	207	197,833	44,007	99,936	20,895
5	3	14	14	49	69	91	52	587	285	749	220
1,606	369	120	30	6,878	1,914	268	150	10,496	2,513	605	236
113	96	38	44	190	188	128	207	695	686	409	521
3	1	4	1	164	33	62	13	915	284	646	160
84	17	302	67	—	—	—	—	84	17	302	67
79	25	180	43	397	192	213	154	1,119	731	1,171	727
85	53	78	47	158	97	68	42	845	438	951	442
12,011	3,159	7,157	1,874	10,692	4,304	2,219	1,398	220,842	54,521	109,825	26,899
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
—	—	—	—	642	22	996	35	4,002	213	914	3
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
92	23	—	—	52	3	2,077	182	321	37	2,441	208
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
6,300	18	9,702	26	14,586	24	1,134	1	21,532	46	11,655	31
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
637	65	491	110	1,119	242	776	148	2,095	485	1,370	324
—	106	—	136	—	291	—	366	—	781	—	627
—	3,265	—	2,010	—	4,595	—	1,764	—	55,302	—	27,526

to correction in the Annual Returns.

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

	North Coast.				East Coast.			
	1911.		1910.		1911.		1910.	
	Quantity.	Value	Quantity.	Value	Quantity.	Value	Quantity.	Value
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	—	—	—	—	33	62	31	55
Soles,	—	—	—	—	51	193	23	90
Turbot,	—	—	—	—	47	200	24	101
Total Prime Fish,	—	—	—	—	131	455	78	246
Cod,	1,339	471	734	280	2,121	1,391	1,508	1,219
Conger Eel,	18	9	—	—	612	260	485	188
Haddock,	693	192	79	24	647	470	652	528
Hake,	—	—	—	—	662	486	597	482
Herrings,	110,942	17,749	71,741	12,757	217	70	613	171
Ling,	21	7	—	—	470	212	566	135
Mackerel,	6	1	14	3	—	—	—	—
Plaice,	1	1	83	23	446	444	458	520
Ray or Skate,	195	50	2	1	462	221	596	103
Sprats,	—	—	—	—	—	—	—	—
Whiting,	12	7	10	5	771	666	840	588
All other except Shell Fish,	602	154	291	53	394	251	643	345
Total,	113,829	18,641	72,954	13,146	6,933	4,926	7,036	4,605
SHELL FISH :—	No.		No.		No.		No.	
Crabs,	—	—	480	1	530	2	—	—
Lobsters,	48	2	—	—	3,247	234	1,163	63
Mussels,	Cwts.	—	Cwts.	—	162	11	Cwts.	15
Oysters,	No.	—	No.	—	4,480	11	No.	34
Other Shell Fish,	Cwts.	—	Cwts.	—	361	181	Cwts.	47
Total,	10	1	—	—	—	—	—	—
Total value of Fish Landed,	—	3	—	1	—	439	—	159
Total value of Fish Landed,	—	18,644	—	13,147	—	5,365	—	4,764

NOTE.—The above figures are subject

IRELAND.

as landed on the IRISH COASTS during the month of February, 1911, as corresponding period in 1910.

South Coast.				West Coast.				Total.			
1911.		1910.		1911.		1910.		1911.		1910.	
Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
—	—	1	2	—	—	—	—	33	62	32	57
8	34	16	77	35	155	41	176	94	382	80	343
—	—	1	3	27	112	7	33	74	312	32	137
8	34	18	82	62	267	48	209	201	756	144	537
30	19	5	5	526	192	324	144	4,016	2,073	2,571	1,648
—	—	—	—	230	65	25	10	860	334	510	198
17	13	16	16	856	458	602	375	2,213	1,133	1,349	943
—	—	—	—	—	—	—	—	662	488	597	482
1,703	267	1,424	224	852	160	91	39	113,714	18,246	73,869	13,191
9	5	—	—	306	140	53	27	806	364	619	182
28	6	18	5	86	45	322	118	120	52	354	126
21	18	43	39	172	166	138	215	640	629	722	797
—	—	5	1	173	41	34	8	830	312	637	173
—	—	—	—	—	—	—	—	—	—	—	—
5	5	80	19	86	59	312	147	874	737	1,242	759
69	44	110	62	95	74	125	94	1,160	523	1,169	544
1,890	411	1,719	453	3,444	1,667	2,074	1,376	126,096	25,645	83,783	19,580
No.	—	No.	—	No.	—	No.	—	No.	530	No.	480
—	—	—	—	—	—	—	—	—	2	—	1
—	—	—	—	240	8	1,068	34	3,535	244	2,231	97
Cwts.	—	Cwts.	—	Cwts.	554	Cwts.	104	Cwts.	785	Cwts.	1,293
69	17	—	—	—	32	1,124	—	—	60	—	119
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
7,056	17	5,418	11	25,094	34	8,694	13	37,230	62	42,416	58
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
416	92	486	86	863	188	713	142	1,650	462	1,274	275
—	126	—	97	—	262	—	293	—	830	—	550
—	537	—	550	—	1,929	—	1,669	—	26,475	—	20,130

to correction in the Annual Returns.

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned
compared with the

	North Coast.				East Coast.			
	1911.		1910.		1911.		1910.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	—	—	—	—	49	77	25	48
Soles,	—	—	—	—	58	229	24	91
Turbot,	—	—	—	—	41	168	37	153
Total Prime Fish,	—	—	—	—	148	474	86	292
Cod,	34	20	307	110	1,791	1,245	2,814	1,678
Conger Eel,	—	—	1	1	743	296	738	185
Haddock,	28	10	65	21	875	577	866	635
Hake,	—	—	—	—	887	683	1,163	829
Herrings,	404	98	5,614	1,154	60	24	285	87
Ling,	—	—	—	—	700	319	318	146
Mackerel,	3	2	427	111	—	—	—	—
Plaice,	129	134	98	99	426	472	552	653
Ray or Skate,	89	22	77	32	631	274	991	227
Sprats,	—	—	—	—	—	—	—	—
Whiting,	—	—	—	—	820	640	1,030	680
All other except Shell Fish	66	13	179	37	434	246	1,284	645
Total,	753	299	6,768	1,565	7,515	5,250	10,127	6,057
SHELL FISH :—	No.		No.		No.		No.	
Crabs,	96	1	1,440	3	—	—	149	1
Lobsters,	60	2	—	—	1,994	124	1,634	75
Mussels,	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
Oysters,	—	—	—	—	70	4	219	20
Other Shell Fish,	No.	—	No.	—	No.	—	No.	—
	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
	—	—	—	—	27,227	48	12,852	13
	—	—	—	—	500	240	247	122
Total,	—	3	—	3	—	416	—	231
Total value of Fish landed	—	302	—	1,568	—	5,666	—	6,288

NOTE.—The above figures are subject

IRELAND.

as landed on the IRISH COASTS during the month of March, 1911, as corresponding period in 1910.

South Coast.				West Coast.				Total.			
1911.		1910		1911		1910		1911.		1910.	
Quan- tity.	Value	Quan- tity.	Value	Quan- tity	Value	Quan- tity.	Value	Quan- tity.	Value	Quan- tity.	Value
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
—	—	5	11	—	—	—	—	49	77	30	59
16	72	38	174	286	1,351	355	1,715	360	1,652	417	1,980
—	—	4	17	22	101	18	64	63	269	59	234
16	72	47	202	308	1,452	373	1,779	472	1,998	506	2,273
24	20	49	36	2,037	856	3,418	1,110	3,886	2,141	6,588	2,934
—	—	—	—	28	9	146	60	771	305	885	246
34	24	14	13	1,453	715	3,124	1,479	2,300	1,326	4,069	2,148
—	—	—	—	75	47	28	11	962	730	1,191	840
30	10	78	20	1,106	191	1,659	317	1,600	323	7,636	1,578
11	6	19	14	532	264	826	386	1,243	589	1,163	546
63	25	3	2	120	64	34	9	186	91	64	122
137	112	127	126	380	505	505	714	1,072	1,223	1,282	1,592
5	1	26	7	99	21	313	56	824	318	1,407	322
—	—	—	—	—	—	—	—	—	—	—	—
38	16	163	41	326	163	397	181	1,184	819	1,590	902
130	78	227	111	339	230	642	160	969	567	2,332	953
488	364	753	572	6,803	4,517	11,465	6,262	15,559	10,430	28,713	14,456
No.	—	No.	—	No.	—	No.	—	No.	96	No.	1,589
—	—	24	1	1,272	44	2,738	95	3,326	170	4,126	171
Cwts.	—	Cwts.	—	Cwts.	27	Cwts.	159	Cwts.	420	Cwts.	1,454
—	—	—	—	350	27	1,235	159	420	31	1,454	179
No.	8,694	No.	32	No.	16	No.	7	No.	48,521	No.	24,477
Cwts.	366	Cwts.	78	Cwts.	766	Cwts.	595	Cwts.	1,632	Cwts.	1,273
—	73	—	111	—	243	—	397	—	735	—	742
—	437	—	683	—	4,760	—	6,659	—	11,165	—	15,198

to correction in the Annual Returns.

STATEMENT of the TOTAL VALUE of FISH landed on the ENGLISH and WELSH COASTS during the Month and Three Months ended 31st March, 1911, compared with the corresponding Periods of the Year 1910.

	March.		Three months ended 31st March.	
	1911.	1910.	1911.	1910.
	VALUE.			
	£	£	£	£
Brill,	4,301	4,125	13,257	13,237
Soles,	38,666	39,062	104,608	102,126
Turbot,	16,787	21,475	58,926	71,363
Prime Fish not separately distinguished,	486	484	853	580
Total Prime Fish, ..	60,240	65,146	177,644	187,306
Bream,	1,014	1,396	4,671	5,873
Catfish,	2,828	3,591	5,993	6,796
Coalfish,	9,333	7,031	28,253	23,564
Cod,	161,463	137,642	398,812	375,346
Conger Eels,	2,865	3,655	9,347	8,753
Dabs,	6,277	9,004	17,306	27,158
Dogfish,	298	318	1,958	2,315
Dory,	163	328	452	567
Flounders or Flukes, ..	773	627	1,639	1,367
Gurnards,	2,449	2,543	6,050	6,764
Haddock,	118,988	110,744	315,090	307,929
Hake,	34,431	45,179	118,506	116,804
Halibut,	29,762	25,776	68,218	60,647
Latchets (Tubs),	128	211	347	542
Lemon Soles,	10,626	10,985	25,900	25,074
Ling,	7,217	8,546	20,768	21,242
Megrims,	5,751	6,261	17,637	19,516
Monks (or Anglers), ..	1,486	1,399	4,299	4,436
Mullet (Red),	432	487	693	893
Plaice,	82,268	72,393	222,324	201,117
Pollack,	1,958	2,911	4,944	5,117
Skates and Rays,	16,722	21,015	49,975	60,705
Torsk,	869	634	2,473	1,614
Whiting,	18,069	19,987	54,802	62,029
Witches,	4,476	5,332	12,275	18,811
Herrings,	224	642	12,321	5,549
Mackerel,	28,217	30,398	41,444	34,341
Mullet (Grey),	181	437	410	786
Pilchards,	2	8	20	15
Sprats,	164	108	5,103	4,522
Whitebait,	1,200	1,080	3,040	3,347
Fish not separately distinguished,	18,909	18,397	41,806	43,511
Total,	629,783	614,211	1,674,520	1,644,356
Shell Fish :—				
Crabs,	3,290	3,001	6,595	4,915
Lobsters,	1,406	1,679	2,856	2,789
Oysters,	3,413	5,421	10,147	17,674
Other Shell Fish,	7,566	8,243	22,493	23,117
Total,	15,675	18,344	42,091	48,495
Total value of all Fish,	645,458	632,555	1,716,611	1,692,851

NOTE.—The figures for 1911 are subject to correction.

STATEMENT of the TOTAL QUANTITY of FISH landed on the ENGLISH and WELSH COASTS during the Month and Three Months ended 31st March, 1911, compared with the corresponding Periods of the Year 1910.

	March.		Three months ended 31st March.	
	1911.	1910	1911.	1910.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Brill,	1,195	1,235	3,932	3,917
Soles,	5,537	6,123	15,794	14,080
Turbot,	3,142	4,001	11,415	13,399
Prime Fish not separately distinguished,	357	310	587	375
Total Prime Fish,	10,231	11,669	31,728	31,771
Bream,	2,527	3,327	12,896	12,589
Catfish,	5,168	5,897	10,588	10,329
Coalfish,	36,006	41,431	113,904	108,544
Cod,	315,596	288,274	702,858	679,032
Conger Eels,	3,330	4,333	11,361	9,820
Dabs,	7,809	11,703	21,434	30,842
Dogfish,	872	1,131	7,760	8,070
Dory,	137	333	410	508
Flounders or Flukes,	1,522	1,077	3,466	2,207
Gurnards,	8,796	8,008	22,963	19,458
Haddock,	155,103	151,182	391,837	373,613
Hake,	32,386	50,365	107,233	112,422
Halibut,	9,703	7,224	19,313	15,751
Latchets (Tubs),	240	378	557	796
Lemon Soles,	4,358	4,158	9,540	8,162
Ling,	15,442	18,773	46,017	46,929
Megrims,	6,630	8,070	22,409	21,815
Monks (or Anglers),	3,417	3,155	9,913	9,293
Mullet (Red),	154	182	243	288
Plaice,	74,481	61,973	211,319	142,566
Pollack,	4,714	6,680	10,631	10,390
Skates and Rays,	27,454	30,984	79,981	85,935
Torsk,	1,386	1,188	3,715	2,790
Whiting,	32,522	40,276	98,861	109,161
Witches,	3,242	4,493	8,634	12,659
Herrings,	629	2,304	33,378	13,420
Mackerel,	51,499	47,290	75,258	51,676
Mullet (Grey),	92	244	219	487
Pilchards,	10	56	40	68
Sprats,	605	449	31,838	27,676
Whitebait,	594	598	1,483	1,837
Fish not separately distinguished,	37,085	39,389	84,159	86,701
Total,	853,740	856,594	2,185,946	2,047,605
Shell :—	No.	No.	No.	No.
Crabs,	327,159	263,631	616,114	391,056
Lobsters,	26,262	32,681	52,952	53,381
Oysters,	1,233,627	1,759,612	3,702,328	5,490,896
	Cwts.	Cwts.	Cwts.	Cwts.
Other Shell Fish,	34,010	37,136	112,181	118,762

NOTE.—The figures for 1911 are subject to correction.

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as landed on the SCOTTISH COASTS during the Month and Three Months ended 31st March, 1911, compared with the corresponding periods of the Year 1910.

	March		Three Months ended 31st March.	
	1911.	1910.	1911.	1910.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Herrings,	36,026	63,064	246,852	268,310
Sprats,	37	25	3,288	832
Sparlings,	9	23	48	99
Mackerel,	2,091	688	5,878	5,597
Cod,	114,272	138,445	260,709	267,378
Ling,	26,769	23,097	54,100	51,889
Torsk (Tusk),	3,005	3,099	6,023	4,662
Saith (Coal Fish),	18,281	18,436	48,970	53,187
Haddock,	88,818	87,173	240,700	219,051
Whiting,	16,500	15,268	41,854	38,167
Conger Eel,	9,872	6,497	24,585	16,812
Turbot,	318	347	1,004	1,089
Halibut,	3,524	3,038	6,063	5,435
Lemon Soles,	2,180	2,573	6,452	5,870
Flounders, Plaice, Brill,	5,497	7,566	15,957	17,171
Skate and Ray,	24,616	21,474	53,542	47,431
Fish not separately distinguished, except Shell Fish,	9,405	10,822	23,046	26,463
Total,	361,820	401,595	1,039,071	1,029,413
Shell Fish :—				
	No.	No.	No.	No.
Crabs,	192,715	122,660	487,214	270,799
Lobsters,	36,094	37,383	92,803	98,647
Oysters,	119,429	160,030	385,637	413,756
	Cwts.	Cwts.	Cwts.	Cwts.
Clams,	1,885	1,812	5,010	3,320
Mussels,	7,753	6,111	28,549	30,020
Other Shell Fish,	5,525	6,309	14,198	13,881
VALUE.				
	£	£	£	£
Herrings,	7,343	13,640	61,023	81,582
Sprats,	10	9	530	181
Sparlings,	36	66	131	274
Mackerel,	756	379	2,176	2,479
Cod,	44,193	50,656	113,863	118,541
Ling,	8,730	7,981	19,888	19,015
Torsk (Tusk),	905	812	1,994	1,555
Saith (Coal Fish)	2,951	2,501	9,162	9,630
Haddock,	49,557	49,937	142,559	148,898
Whiting,	7,315	6,008	18,785	19,081
Conger Eel,	3,092	2,668	8,327	6,604
Turbot,	1,374	1,384	3,659	4,249
Halibut,	7,026	7,232	14,474	13,731
Lemon Soles,	5,424	5,785	15,665	14,799
Flounders, Plaice, Brill,	7,480	9,584	20,817	23,431
Skate and Ray,	6,576	5,862	14,613	13,636
Fish not separately distinguished except Shell Fish,	5,531	5,443	14,057	15,796
Total,	150,199	170,077	462,528	493,704
Shell Fish :—				
	£	£	£	£
Crabs,	1,135	1,002	2,733	1,799
Lobsters,	2,380	2,517	5,885	5,830
Oysters,	414	567	1,345	1,467
Clams,	281	273	755	507
Mussels,	384	377	1,886	1,935
Other Shell Fish,	1,292	1,449	3,025	3,369
Total,	5,886	6,185	15,129	14,897
Total value of Fish landed,	165,085	176,262	477,657	507,991

NOTE.—The above figures are subject to correction in the Annual Returns.

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as landed on the IRISH COASTS during the Month and Three Months ended 31st March, 1911, compared with the corresponding Periods of the Year 1910.

	March .		Three Months ended 31st March.	
	1911.	1910.	1911.	1910.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Brill,	49	30	125	125
Soles,	360	417	576	575
Turbot,	63	59	107	132
Total Prime Fish,	472	506	898	832
Cod,	3,886	6,588	12,214	11,548
Conger Eel,	771	885	2,176	1,938
Haddock,	2,390	4,069	7,221	6,565
Hake,	962	1,191	2,192	2,585
Herrings,	1,600	7,636	313,147	181,441
Ling,	1,243	1,163	2,636	2,531
Mackerel,	186	464	10,802	1,423
Plaice,	1,072	1,282	2,407	2,413
Ray or Skate,	824	1,407	2,569	2,690
Sprats,	-	-	84	302
Whiting,	1,184	1,590	3,177	4,003
Fish not separately distinguished, except Shell Fish,	960	2,332	2,974	4,452
Total	15,559	29,113	362,497	222,721
Shell Fish :—				
	No.	No.	No.	No.
Crabs,	96	1,589	626	2,983
Lobsters,	3,326	4,126	10,863	7,929
Oysters,	48,621	24,477	107,283	78,548
Mussels,	Cwts.	Cwts.	Cwts.	Cwts.
Other Shell Fish,	420	1,454	1,526	5,188
	1,632	1,273	5,377	3,917
VALUE.				
	£	£	£	£
Brill,	77	59	211	201
Soles,	1,652	1,980	2,539	2,657
Turbot,	269	234	847	541
Total Prime Fish,	1,998	2,273	3,597	3,399
Cod,	2,141	2,934	6,599	6,070
Conger Eel,	305	246	888	618
Haddock,	1,826	2,148	4,097	3,910
Hake,	730	840	1,661	1,882
Herrings,	323	1,578	62,576	35,664
Ling,	589	546	1,238	945
Mackerel,	91	122	2,656	484
Plaice,	1,223	1,592	2,538	2,910
Ray or Skate,	318	322	914	665
Sprats,	-	-	17	67
Whiting,	819	902	2,287	2,385
Fish not separately distinguished, except Shell Fish,	567	953	1,528	1,939
Total,	10,430	14,456	90,596	60,935
Shell Fish :—				
Crabs,	1	4	3	8
Lobsters,	170	171	627	389
Oysters,	81	52	189	141
Mussels,	31	179	128	506
Other Shell Fish,	452	356	1,399	935
Total,	735	742	2,346	1,919
Total Value of Fish landed,	11,165	15,198	92,942	62,854

NOTE.—The above figures are subject to correction in the Annual Returns.

QUARTERLY AVERAGE PRICES of CROPS, LIVE STOCK, MEAT, PROVISIONS, &c
for the period ended 31st MARCH, 1911.

PRODUCT	PROVINCE				IRELAND	
	Leinster.	Munster.	Ulster.	Con-naught.	1911	1910.
	s d	s d	s d	s d.	s d.	s d
CROPS —						
Wheat, . . . per 112 lbs	7 1	6 4	—	—	7 0½	9 1½
Oats (White) . . . "	6 4½	6 2½	5 8½	5 11½	5 10½	6 2½
.. Black . . . "	5 10	5 7	—	—	5 7½	6 0½
Barley, . . . "	—	—	—	—	—	—
Potatoes . . . "	3 7	3 4½	3 2	4 0½	3 5½	3 0½
Hay (Clover) . . . "	4 0½	3 2½	3 0	3 1½	3 5½	4 9½
.. (Meadow) . . . "	2 7½	2 1½	3 0½	2 2½	2 ½	3 8½
Grass Seed—	—	—	—	—	—	—
(Perennial Rye) . . . "	—	—	13 11½	—	13 11½	14 6½
(Italian Rye) . . . "	—	—	—	—	—	—
Flax . . . per 14 lbs.	—	—	10 2½	—	10 2½	8 0½
	£ s d.	£ s d.	£ s d.	£ s d.	£ s d.	£ s d.
LIVE STOCK —						
Calves (young . . . per head	2 6 8	1 13 2	1 12 5	2 0 11	2 3 0	—
.. (over 6 and not exceeding	—	—	—	—	—	—
.. 12 months) per head	6 2 0	6 2 6	4 10 4	5 7 2	5 16 7	—
Store Cattle—						
One year old and under two	9 8 2	9 5 0	7 11 3	8 10 5	8 19 7	7 17 8
years . . . per head	—	—	—	—	—	—
Two years old and under	12 5 8	11 12 4	10 0 6	11 9 7	11 14 0	10 10 3
three years . . . per head	—	—	—	—	—	—
Three years old and over ..	13 10 9	13 7 2	12 0 0	13 17 6	13 13 8	12 16 7
Fat Cattle—						
Two years old and under	—	—	—	—	—	—
three years . . . per head	14 11 9	14 5 8	13 6 6	14 12 5	14 7 3	—
Three years old and over ..	16 13 11	15 7 6	14 12 10	15 17 2	16 9 7	—
Cows and Bulls . . . per head	14 10 3	12 4 7	13 17 0	15 1 7	13 19 0	—
Springers—						
Cows and Heifers per head	16 0 8	15 3 0	15 5 3	15 9 0	15 9 0	14 4 3
Milch Cows (down calved) ..	14 13 1	13 15 8	12 19 8	13 3 5	14 2 2	—
Lambs (under 12 months old)	—	—	—	—	—	—
per head	1 10 10	1 12 3	1 6 9	1 8 6	1 11 0	1 10 8
Store Sheep—						
One year old and under two	—	—	—	—	—	—
years . . . per head	1 12 10	1 15 7	1 14 0	1 11 9	1 13 8	1 10 6
Two years old and over ..	1 16 9	2 2 2	1 16 0	1 18 4	1 17 9	2 5 2
Fat Sheep—						
One year old and under two	—	—	—	—	—	—
years . . . per head	2 2 3	2 6 2	1 19 10	2 7 2	2 4 5	—
Two years old and over ..	2 1 11	2 7 3	1 18 7	2 6 4	2 3 8	—
Young Pigs—						
8 to 10 weeks old per head	1 2 6	1 5 4	1 6 6	1 4 1	1 4 2	1 7 9
Under four months old ..	1 15 7	1 15 5	2 1 10	2 6 7	1 17 4	—
Fat Pigs						
.. . . .	3 12 6	4 1 7	—	5 5 0	4 10 6	—
Sows,	5 9 10	7 3 8	6 4 4	6 10 2	6 8 0	—
MEAT, PROVISIONS, &c.						
	s d.	s d.	s d.	s d.	s d.	s d.
Beef (Live) . . . per 112 lbs.	—	—	—	—	33 4	33 8
.. (Dead) . . . "	—	—	—	—	58 4	58 11
Mutton (Live) . . . "	—	—	—	—	37 6	39 6
.. (Dead) . . . "	—	—	—	—	65 8	69 1
Pork (Dead) . . . "	53 11	55 4	54 7	53 9	55 8	60 2
Butter (Creamery) . . . "	109 11	110 1	—	—	110 1	122 5
.. (Factory) . . . "	95 8	90 2	—	—	91 2	106 4
.. (Farmers) . . . "	91 0	94 8	103 2	87 11	93 6	112 1
Eggs per 120	9 8½	8 10½	—	8 5	9 3½	9 1½
Wool per lb.	0 9½	—	—	0 11½	0 10½	0 10½

WEEKLY AVERAGE PRICES of WHEAT, OATS, and BARLEY, per 112 lbs., computed from Market Returns of certain quantities of these Cereals supplied by Officers of Customs and Excise, during the QUARTER ended 31st MARCH, 1911.

Returns received in the Week ended	WHEAT.		OATS.		BARLEY.	
	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.
1911.	s. d.	Cwts. of 112 lbs.	s. d.	Cwts. of 112 lbs.	s. d.	Cwts. of 112 lbs.
January, 7	6 4	9	5 5	5,259	—	—
" 14	7 0½	1,482	5 5½	7,245	—	—
" 21	7 1½	560	5 7½	7,697	—	—
" 28	7 0½	1,500	5 8½	8,481	6 0	57
February, 4	7 0½	750	5 9½	7,465	—	—
" 11	—	—	5 9½	6,487	—	—
" 18	6 6	14	5 10	7,854	—	—
" 25	—	—	5 10½	6,430	—	—
March, 4	6 8	6	6 0½	5,233	—	—
" 11	—	—	6 0½	4,287	—	—
" 18	—	—	6 0	4,952	—	—
" 25	—	—	6 1	3,463	—	—

QUARTERLY AVERAGE PRICES of FAT CATTLE and FAT SHEEP, per 112 lbs., LIVE WEIGHT, sold in DUBLIN MARKETS during the period ended 31st MARCH, 1911, and also for the corresponding period during fourteen preceding years.

Year.	Fat Cattle.	Fat Sheep.	Year.
	£ s. d.	£ s. d.	
1911,	1 13 4	1 17 6	1911.
1910,	1 13 8	1 19 6	1910.
1909,	1 13 2	1 12 2	1909.
1908,	1 12 9	2 0 0	1908.
1907,	1 12 0	2 3 2	1907.
1906,	1 10 11	2 2 6	1906.
1905,	1 11 5	1 19 9	1905.
1904,	1 10 9	1 19 7	1904.
1903,	1 13 10	2 1 1	1903.
1902,	1 12 6	1 14 8	1902.
1901,	1 12 5	1 16 10	1901.
1900,	1 13 2	1 17 5	1900.
1899,	1 11 8	1 14 1	1899.
1898,	1 9 9	1 16 10	1898.
1897,	1 11 4	1 17 0	1897.

NUMBER of ANIMALS included in Returns furnished under the MARKETS and FAIRS (Weighing of Cattle) ACT, 1891, Sections 3 and 4
during the Quarter ended 31st MARCH, 1911.

WEEK ENDED	FAT CATTLE.				FAT SHEEP.			
	Dublin.		Belfast.		Dublin.		Belfast.	
	Corporation Market Authorities.	Mr. Gavin Low, Auctioneer.	Corporation Market Authorities.	Mr. John Robson, Auctioneer.	Corporation Market Authorities.	Mr. Gavin Low, Auctioneer.	Corporation Market Authorities.	Total Number of Sheep included in Returns.
1911.								
January, 5 .	68	237	50	33	—	256	—	256
" 12 .	87	214	50	29	10	390	—	400
" 19 .	73	186	50	48	10	180	—	190
" 26 .	80	210	50	53	10	311	—	321
February, 2 .	57	183	52	46	15	300	—	315
" 9 .	82	188	52	50	15	288	—	303
" 16 .	70	189	48	50	10	293	—	303
" 23 .	78	130	50	32	—	259	—	259
March, 2 .	61	147	50	48	—	210	—	210
" 9 .	72	139	50	45	—	167	—	167
" 16 .	62	114	50	40	26	251	—	277
" 23 .	64	106	49	39	13	201	—	214
" 30 .	82	113	50	27	13	174	—	187
Total,	936	2,156	651	540	122	3,280	—	3,402

DISEASES OF ANIMALS IN IRELAND.

NUMBER OF OUTBREAKS of SWINE FEVER, and NUMBER of SWINE returned as having been SLAUGHTERED in Ireland, under the Diseases of Animals Act of 1894, in the undermentioned period, by Order of the Department.

Quarter ended.	SWINE-FEVER.	
	Outbreaks confirmed.	Swine Slaughtered as Diseased or as having been Exposed to Infection
31st March, 1911,	35	653

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been Attacked by ANTHRAX and GLANDERS in Ireland in the undermentioned period.

Quarter ended.	ANTHRAX.		GLANDERS (including Farcy).		Epizootic Lymphangitis.	
	Outbreaks Reported.	Animals Attacked	Outbreaks Reported.	Animals Attacked.	Outbreaks Reported.	Animals Attacked.
31st Mar., 1911.	3	3	1	1	—	—

NUMBER of CASES of RABIES in DOGS in IRELAND during the undermentioned period.

Quarter ended.	Number of Cases.
31st March, 1911,	—

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been attacked by SHEEP-SCAB and PARASITIC-MANGE in Ireland in the undermentioned period.

Quarter ended	SHEEP-SCAB.		PARASITIC-MANGE.	
	Outbreaks Reported.	Sheep Attacked.	Outbreaks Reported.	Animals Attacked.
31st Mar., 1911	202	2,739	34	47

Veterinary Branch,
Department of Agriculture and Technical Instruction
for Ireland, Dublin.

BUTTER PRICES DURING THE QUARTER

ABSTRACTED FROM "THE GROCER," "GROCERS' REVIEW,"

Excepting 1-lb. Rolls and Farmers' Butter all quotations are the
 an Irish Creamery would be 5s. to 7s. per cwt. less than
 freight, commission

COUNTRY OF ORIGIN.	Type of Package	Place of Sale.	WEEK ENDED.			
			JANUARY.			
			7th	14th	21st	28th
IRELAND— Creamery Butter,	Kieis, kegs, or pyramid boxes	London, ..	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.
		Liverpool, ..	—	—	—	—
		Bristol, ..	—	—	—	—
		Cardiff, ..	—	—	—	—
		Manchester, ..	110-116	112-117	111-116	110-115
		Birmingham, ..	—	—	—	—
		Glasgow, ..	—	—	—	—
		Limerick, ..	—	—	—	—
		Cork, ..	—	—	—	—
		Belfast, ..	—	—	—	—
Factories, ..	1lb rolls, in boxes. Salted or unsalted	Dublin, ..	112-116	110-112	110-112	110-114
		F. O. R., ..	124-135/4	123/4-135/4	124-135/4	123/6-135/4
		London, ..	94-98	94-98	94-98	94-98
		Liverpool, ..	94-98	96	98	—
		Bristol, ..	94-102	94-102	94-102	96-102
		Cardiff, ..	95	—	—	—
		Manchester, ..	—	—	—	—
		Cork, ..	103	103	103-105	105
		Cork, ..	93-96	89-94	96-102	100-102
		Cork, ..	82-84	81-84	82-86	87-88
Farmers' Butter, ..	Fresh, ..	Cork, ..	84-100	83-102	85-103	86-106
		London, ..	Per doz. lbs. 12/6-15/6	Per doz. lbs. 12/6-15/6	Per doz. lbs. 12/6-15/6	Per doz. lbs. 12/6-15/6
		Paris baskets, ..	Per cwt. 124-130	Per cwt. 124-130	Per cwt. 124-130	Per cwt. 124-130
		Copenhagen Quotation, {	95 Kr. 108/6 per 50 Kilos	97 Kr. 108/6 per 50 Kilos	97 Kr. 108/6 per 50 Kilos	97 Kr. 108/7 per 50 Kilos
		Average over-price.	—	—	—	—
		Kieis, ..	113-115	115-117	115-118	115-117
		London, ..	115-120	116-120	117-121	116-120
		Bristol, ..	—	—	—	—
		Cardiff, ..	117-120	117-120	120-122	119-121
		Manchester, ..	118-117	115-113	116-120	114-119
DENMARK AND SWEDEN.	1lb. rolls, 10 x 24 lbs. boxes.	Birmingham, ..	116-116	115-117	117-119	116-118
		Newcastle-on-Tyne, ..	115-115	114-116	116-118	115-117
		Glasgow, ..	115-117	115-117	120-121	119-120
		Leith, ..	—	115	—	—
		Hull, ..	114	—	115	114-116
		F. O. R. London	—	—	—	—
		Manchester, ..	113-115	113-115	114-116	112-115
		Liverpool, ..	—	—	—	—
		Hull, ..	113	112	118	112-114
		Cardiff, ..	114-116	114-116	117-118	116-117
FINLAND, ..	Kieis, ..	Manchester, ..	113-115	113-115	114-116	112-115
		Liverpool, ..	—	—	—	—
		Hull, ..	113	112	118	112-114
		Cardiff, ..	114-116	114-116	117-118	116-117

ENDED 31ST MARCH, 1911.

"GROCERS' GAZETTE," AND OTHER TRADE REPORTS.

Landed Prices of the Choicest Qualities. The Nett F.O.R. Price to the landed Prices in Great Britain. This figure covers handling, &c.

WEEK ENDED							
FEBRUARY.				MARCH.			
4th	11th	18th	25th	4th	11th	18th	25th
Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.
110-115	110-116	116-120	115-121	114-119	111-116	112-117	113-116
110-114	110-114	129 135/4	126 135/4	110-114	110-114	110-112	110-114
126-135/4	127-135/4			126-130/8	126-130/8	121/4-130/8	118-126
94 98	94-98	94-98	94	94-98	95	95	94
94	96-102	96-102	96-102	96-102	96-102	98-102	94-96
105-109	109	106-110	106-109	103-106	97-103	96-104	99-105
100-102	98-100	98-99	98-100	95-98	89	82-84	84-92
87-88	88	88	88	85-88	73-77	73-76	73-76
88-104	89-105	91-105	91-106	89-106	80-96	75-100	73-95
Per doz. lbs. 12/6-15/6 Per cwt. 124-130	Per doz. lbs. 12/6-15/6 Per cwt. 124-130	Per doz. lbs. 12/6-15/6 Per cwt. 124-130	Per doz. lbs. 12/6-15/6 Per cwt. 124-130	Per doz. lbs. 12/6-15/6 Per cwt. 124-130	Per doz. lbs. 12/6-15/6 Per cwt. 124-130	Per doz. lbs. 12/6-15/6 Per cwt. 124-130	Per doz. lbs. 12/6-15/6 Per cwt. 124-130
97 } 108/5 Kr. } per } 50 } cwt. Kilos.	100 } 111/11 Kr. } per } 50 } cwt. Kilos.	103 } 115/1 Kr. } per } 50 } cwt. Kilos.	108 } 115/2 Kr. } per } 50 } cwt. Kilos.	100 } 111/8 Kr. } per } 50 } cwt. Kilos.	98 } 109/7 Kr. } per } 50 } cwt. Kilos.	100 } 111/10 Kr. } per } 50 } cwt. Kilos.	100 } 112/1 Kr. } per } 50 } cwt. Kilos.
115-117	118-120	122-124	122-124	119-121	117-119	119-121	119-121
117-120	117-123/6	122-130	124-129	120-128	117/6-123	119-124	121-125
119-120	119-121	121-122	125-126	123-125	119-120	119-120	121-122
115-119	116-120	122-123	122-127	120-125	116-121	117-123	120-124
116-119	117-119	121-123	124-126	122-127	117-121	118-121	121-123
115-117	117-119	120-122	123-125	120-122	117-119	118-120	121-123
119-120	119-120	122-123	125-126	123-124	120-121	120-121	122-123
115	117-118	121-122	125	123-124	119-120	121-122	121-122
	120		120	122-124		120-122	
113-116	114-117	119-124	119-124	118-122	114-119	115-120	116-120
112-114	112-114	115-117	116-118	117-119	115	113	113-115
116	116-117	118	122	120-121	116	116	118

(Continued on Page 574.5.)

BUTTER PRICES DURING THE QUARTER

ABSTRACTED FROM "THE GROCER," "GROCERS' REVIEW,"

Excepting 1 lb. Rolls and Farmers' Butter all quotations are the
an Irish Creamery would be 5s. to 7s. per cwt. less than
freight, commission,

COUNTRY OF ORIGIN.	Type of Package.	Place of Sale.	WEEK ENDED.			
			JANUARY.			
			7th	14th	21st	28th
RUSSIA AND SIBERIA.	Kieles, ..	London, ..	Per cwt. s. s. 98-102	Per cwt. s. s. 100-104	Per cwt. s. s. 102-106	Per cwt. s. s. 100-104
		Liverpool, ..	102-103	103	101-106	102-105
		Bristol, ..	99-102	104	104	104
		Cardiff, ..	100-103	102	104	101
		Manchester, ..	102-105	102-106	102-105	100-104
		Birmingham, ..	100-104	100-104	102-106	102-104
		Glasgow, ..	102-104	102-104	102-104	102-104
		Leith, ..	104	104	104	104
		Hull, ..	-	-	-	-
		Hull, ..	-	-	-	-
HOLLAND, ..	Boxes, ..	London, ..	-	-	-	-
	Rolls, ..	do., ..	Per doz. lbs. 13/6-14	Per doz. lbs. 13/6-14	Per doz. lbs. 14-14/8	Per doz. lbs. 14-14/8
	Boxes, ..	Glasgow—	Per cwt.	Per cwt.	Per cwt.	Per cwt.
		Fresh, ..	122-124	122-124	130-132	122-130
		Salt, ..	118-119	118-119	126-127	125-126
		Manchester, ..	-	-	-	-
ITALY, ..	Rolls, ..	London, ..	Per doz. lbs. 14-15	Per doz. lbs. 14-15	Per doz. lbs. 14-15	Per doz. lbs. 14-15
	Rolls, ..	London, ..	Per cwt.	Per cwt.	Per cwt.	Per cwt.
CANADA, ..	56lb. boxes,	London, ..	-	-	-	-
		Liverpool, ..	-	-	-	-
		Bristol, ..	106-110	106-110	106-110	104-110
		Cardiff, ..	104-106	104-106	106	-
		Birmingham, ..	-	-	-	-
		Glasgow, ..	-	-	-	-
AUSTRALIA AND NEW ZEALAND.*	Boxes, ..	London, ..	A. s. 100-104 u. 100-106 Z. 104-108	A. s. 102-106 u. 104-108 Z. 108-112	A. s. 102-107 u. 104-110 Z. 108-112	A. s. 98-104 u. 102-106 Z. 104-106
		Liverpool, ..	A. 104-107 Z. 108-110	A. 104-110 Z. 110-114	A. 106-110 Z. 110-114	A. 104-108 Z. 108-112
		Bristol, ..	A. 107-109 Z. 112-114	A. 110-112 Z. 113-116	A. 108-112 Z. 113-116	A. 108-110 Z. 110-112
		Cardiff, ..	A. 106-109 Z. 109-111	A. 108-112 Z. 112-114	A. 108-114 Z. 114-116	A. 106-108 Z. 110-112
		Manchester, ..	A. 102-106 Z. 107-111	A. 106-108 Z. 109-112	A. 106-110 Z. 111-113	A. 105-108 Z. 110-112
		Birmingham, ..	A. 102-105 Z. 108-109	A. 104-106 Z. 109-111	A. 108 Z. 111-113	A. 104-106 Z. 110-112
		Glasgow, ..	A. 104-105 Z. 107-108	A. 105-107 Z. 110-111	A. 109-110 Z. 112-114	A. 106-107 Z. 110-112
		Leith, ..	A. - Z. -	A. - Z. -	A. - Z. -	A. - Z. -
		Hull, ..	A. 104-108 Z. -	A. 110-112 Z. -	A. 108-112 Z. -	A. 106-110 Z. -
		London, ..	102-104	104-108	-	-
		Liverpool, ..	102-107	106-110	106-110	104-107
		Bristol, ..	-	-	-	-
		Cardiff, ..	108-109	110-112	115-116	108-111
		Manchester, ..	102-107	104-108	106-110	105-108
		Birmingham, ..	108-109	109-111	-	-
		Glasgow, ..	-	110-112	-	-
		London, ..	-	-	-	-
		Liverpool, ..	-	-	-	-
		Bristol, ..	-	-	-	-
		Cardiff, ..	-	-	-	-
		Manchester, ..	-	-	-	-
ARGENTINA, ..	Boxes, ..	London, ..	102-104	104-108	-	-
		Liverpool, ..	102-107	106-110	106-110	104-107
		Bristol, ..	-	-	-	-
		Cardiff, ..	108-109	110-112	115-116	108-111
		Manchester, ..	102-107	104-108	106-110	105-108
UNITED STATES	Tubs & boxes,	London, ..	-	-	-	-
		Liverpool, ..	-	-	-	-
		Bristol, ..	-	-	-	-
		Cardiff, ..	-	-	-	-
		Manchester, ..	-	-	-	-

* A—Australia.

Z.—New Zealand.

s.—salted.

u.—unsalted.

ENDED 31st MARCH, 1911.—continued.

"GROCERS' GAZETTE," AND OTHER TRADE REPORTS.

Landed Prices of the Choicest Qualities. The Nett F.O.R. Price to the landed Prices in Great Britain. This figure covers handling, &c.

[illegible]

TABLES SHOWING THE EXPORTS

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT
the PORTS of EMBARKATION

IRISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ballina, . . .	124	-	-	-	43	-	167	54	-	-	54
Belfast, . . .	7,522	14,284	1,429	1,546	107	143	25,031	1,811	50	-	1,361
Coleraine, . . .	16	176	-	-	3	-	195	-	-	-	-
Cork, . . .	1,170	8,103	548	936	632	1,325	12,714	6,318	-	3	6,321
Drogheda, . . .	3,332	20	27	5	-	-	3,384	1,048	-	-	1,048
Dublin, . . .	35,371	23,125	5,967	816	513	1,460	67,258	35,893	-	7	35,900
Dundalk, . . .	3,839	1,757	35	32	-	-	5,663	183	-	-	183
Dundrum, . . .	-	12	1	2	-	-	15	-	-	-	-
Greenore, . . .	296	663	192	304	-	2	1,457	236	-	-	236
Larne, . . .	188	5,399	37	2	-	156	5,782	70	41	-	111
Limerick, . . .	7	15	-	-	301	3	326	-	40	-	40
Londonderry, . . .	2,627	7,120	194	927	91	1,116	12,075	777	-	-	777
Milford, . . .	1	64	-	-	-	-	65	-	-	-	-
Mulroy, . . .	5	23	-	-	3	-	31	-	-	-	-
Newry, . . .	31	127	13	5	-	-	176	420	-	-	420
Portrush, . . .	3	25	-	-	-	-	28	-	-	-	-
Rosslare, . . .	-	-	-	-	-	-	-	-	-	-	-
Silgo, . . .	89	216	-	-	132	-	437	500	-	-	500
Warrenpoint, . . .	-	-	-	-	-	-	-	-	-	-	-
Waterford, . . .	7,225	7,539	11	51	209	320	15,355	4,481	-	1	4,482
Westport, . . .	70	66	-	4	44	-	184	970	-	-	970
Wexford, . . .	1,091	-	-	-	-	-	1,091	1,700	-	-	1,700
TOTAL, . . .	63,007	68,734	8,454	4,630	2,078	4,531	151,434	53,961	131	11	54,108

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT
the PORTS of DEBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ardrossan, . . .	2,059	1,198	703	453	11	78	4,502	-	-	-	-
Ayr, . . .	2,274	8,127	258	465	16	85	11,220	128	-	-	128
Barrow, . . .	128	1,251	73	87	-	-	1,539	28	-	-	28
Bristol, . . .	786	639	145	228	2	309	2,109	1,171	-	-	1,171
Cardiff, . . .	-	-	-	-	-	-	-	-	-	-	-
Dover, . . .	-	-	-	-	-	-	-	-	-	-	-
Fishguard, . . .	4,864	7,350	326	527	37	936	14,040	5,057	-	3	5,060
Fleetwood, . . .	2,408	1,613	244	237	28	-	4,530	154	-	-	154
Glasgow, . . .	6,794	13,069	537	958	1,305	2,424	25,087	362	40	-	402
Greenock, . . .	3	1,721	-	1	-	-	1,725	-	-	-	-
Heysham, . . .	1,503	8,478	372	349	59	108	11,369	857	50	-	907
Holyhead, . . .	8,874	7,450	981	401	75	32	17,813	11,446	-	2	11,448
Liverpool, . . .	24,982	11,492	4,177	869	545	256	42,321	31,397	-	6	31,343
London, . . .	1	3	-	-	-	-	4	-	-	-	-
Manchester, . . .	5,967	-	24	-	-	-	5,991	3,351	-	-	3,351
Newhaven, . . .	-	75	-	3	-	-	78	-	-	-	-
Plymouth, . . .	154	19	-	-	-	167	340	-	-	-	-
Preston, . . .	353	-	5	-	-	-	358	-	-	-	-
Silloth, . . .	1,646	1,089	76	-	-	-	2,811	40	-	-	40
Southampton, . . .	28	97	-	48	-	-	171	30	-	-	30
Stranraer, . . .	185	5,051	37	2	-	136	5,411	-	41	-	41
Whitehaven, . . .	-	12	1	2	-	-	15	-	-	-	-
TOTAL, . . .	63,007	68,734	8,454	4,630	2,078	4,531	151,434	53,961	131	11	54,108

AND IMPORTS OF ANIMALS.

I.

BRITAIN during the Three Months ended 31st MARCH, 1911, showing in Ireland.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals	IRISH PORTS.
Fat.	Stores.	Total.		Stallions.	Mares.	Geldings.	Total.				
521	-	521	-	-	-	-	-	-	3	745	Ballina.
1,230	2,272	3,502	2	4	543	928	1,475	-	8	31,379	Belfast.
2	-	2	-	-	-	-	-	-	-	197	Coleraine.
5,058	-	5,058	-	3	127	171	301	-	206	24,680	Cork.
991	228	1,219	5	-	10	6	16	-	-	5,672	Drogheda.
63,576	40	63,615	7	12	1,160	969	2,141	5	132	169,058	Dublin.
4,247	976	5,222	132	-	306	180	495	-	-	11,695	Dundalk.
-	-	-	-	-	-	-	-	-	-	15	Dundrum.
438	277	713	91	3	605	409	1,017	-	-	3,514	Greenore.
12	1,761	1,773	-	5	38	71	114	-	1	7,781	Larne.
-	-	-	-	-	-	-	-	-	-	366	Limerick.
430	30	460	-	-	11	21	32	-	9	13,353	Londonderry.
79	-	79	-	-	-	1	1	-	-	145	Milford.
291	-	291	-	-	-	-	-	-	1	323	Mulroy.
234	14	248	-	-	4	1	5	-	-	849	Newry.
2	-	2	-	-	-	1	1	-	-	31	Portrush.
-	-	-	1	-	7	19	26	-	1	28	Rosslare.
6,684	142	6,826	-	-	2	3	5	-	-	7,768	Sligo.
9,122	-	9,122	-	1	318	378	697	-	-	29,656	Warrenpoint.
3,308	-	3,308	3	-	2	1	3	-	-	4,468	Waterford.
1,780	-	1,780	2	-	-	-	-	-	-	4,573	Wexford.
98,002	5,739	103,741	243	28	3,133	3,168	6,329	5	361	316,216	TOTAL.

II.

BRITAIN during the Three Months ended 31st MARCH, 1911, showing in GREAT BRITAIN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals	BRITISH PORTS.
Fat.	Stores.	Total.		Stallions.	Mares.	Geldings.	Total.				
67	821	888	1	-	27	157	184	-	-	5,575	Androssan.
88	2,124	2,212	-	1	8	22	31	-	-	13,591	Ayr.
964	134	1,098	-	-	7	11	18	-	-	2,683	Barrow.
4,237	-	4,237	-	-	39	44	83	-	2	7,602	Bristol.
-	-	-	-	-	-	-	-	-	-	-	Cardiff.
-	-	-	-	-	7	1	8	-	-	8	Dover.
5,048	-	5,048	1	4	384	476	864	-	28	25,041	Fishguard.
196	29	225	1	1	342	417	760	-	2	5,672	Fleetwood.
6,667	7	6,674	3	2	100	223	325	-	13	32,504	Glasgow.
1	10	11	-	-	2	6	8	-	-	1,714	Greenock.
6,546	20	6,566	-	-	134	200	334	-	6	19,182	Heysham.
45,212	314	45,526	91	14	1,441	1,045	2,500	-	-	77,378	Holyhead.
27,501	868	28,369	140	1	525	410	936	5	209	103,419	Liverpool.
-	-	-	-	-	3	6	9	-	-	13	London.
323	-	323	-	-	62	55	117	-	10	9,792	Manchester.
-	-	-	-	-	-	-	-	-	-	78	Newhaven.
212	-	212	-	-	1	7	8	-	-	560	Plymouth.
436	-	436	-	-	-	-	-	-	-	793	Preston.
408	-	408	-	-	12	15	27	-	-	3,286	Silloth.
97	-	97	-	-	1	30	31	-	-	301	Southampton.
-	1,412	1,412	-	5	38	71	114	-	1	6,979	Stranraer.
-	-	-	-	-	-	-	-	-	-	15	Whitehaven.
98,002	5,739	103,741	243	28	3,133	3,168	6,329	5	361	316,216	TOTAL.

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT
the PORTS OF

IRISH PORTS.	CATTLE							SHEEP			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ballina, .	-	-	-	-	-	-	-	-	-	-	-
Belfast, .	-	-	-	-	59	-	59	2,168	138	-	2,306
Coleraine, .	-	-	-	-	-	-	-	-	-	-	-
Cork, .	-	2	-	-	-	-	2	-	-	-	-
Drogheda, .	-	-	-	-	-	-	-	-	-	-	-
Dublin, .	-	69	3	-	-	3	75	457	116	1	574
Dundalk, .	-	-	-	-	-	-	-	-	-	-	-
Dundrum, .	-	-	-	-	-	-	-	-	-	-	-
Greenore, .	-	-	1	-	2	1	4	-	-	1	1
Larne, .	-	16	-	-	-	-	16	89	-	-	89
Limerick, .	-	-	-	-	-	-	-	-	-	-	-
Londonderry, .	-	10	1	-	-	3	14	-	-	-	-
Milford, .	-	-	-	-	-	-	-	-	-	-	-
Mulroy, .	-	1	-	-	-	-	1	-	-	-	-
Newry, .	-	-	-	-	-	-	-	-	-	-	-
Portrush, .	-	-	-	-	-	-	-	-	-	-	-
Rosslare, .	-	-	-	-	-	-	-	-	-	-	-
Sligo, .	-	-	-	-	1	-	1	-	-	-	-
Warrenpoint, .	-	-	-	-	-	-	-	-	-	-	-
Waterford, .	-	9	-	-	-	-	9	-	-	-	-
Westport, .	-	-	-	-	-	-	-	-	-	-	-
Wexford, .	-	-	-	-	-	-	-	-	-	-	-
TOTAL, .	-	107	5	-	62	7	181	2,714	254	2	2,970

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT
the PORTS OF EMBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ardrossan, .	-	-	-	-	54	-	54	1,321	-	-	1,321
Ayr, .	-	-	-	-	-	-	-	936	136	-	1,072
Barrow, .	-	-	-	-	-	-	-	-	-	-	-
Bristol, .	-	1	-	-	1	-	2	-	-	-	-
Cardiff, .	-	-	-	-	-	-	-	-	-	-	-
Fa'mouth, .	-	-	-	-	-	-	-	-	-	-	-
Fishguard, .	-	1	-	-	-	-	1	-	-	-	-
Fleetwood, .	-	-	-	-	-	-	-	-	-	-	-
Glasgow, .	-	66	1	-	3	3	73	287	118	-	405
Greenock, .	-	-	-	-	-	-	-	-	-	-	-
Heysham, .	-	-	-	-	1	-	1	-	-	-	-
Holyhead, .	-	14	1	-	2	3	20	-	-	-	-
Liverpool, .	-	-	-	-	-	-	-	60	-	1	61
London, .	-	-	-	-	-	-	-	-	-	-	-
Manchester, .	-	-	-	-	-	-	-	110	-	-	110
Newhaven, .	-	-	-	-	-	-	-	-	-	-	-
Plymouth, .	-	-	-	-	-	-	-	-	-	-	-
Preston, .	-	2	-	-	-	-	2	-	-	-	-
Silloth, .	-	6	-	-	-	-	6	-	-	-	-
Southampton, .	-	1	9	-	-	1	5	-	-	-	-
Stranraer, .	-	16	-	-	-	-	16	-	-	-	-
Whitehaven, .	-	-	-	-	-	-	-	-	-	-	-
TOTAL, .	-	107	5	-	62	7	181	2,714	254	2	2,970

III.

BRITAIN during the Three Months ended 31st MARCH, 1911, showing
DEBARKATION IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
-	-	-	-	9	28	61	98	-	-	2,463	Ballina.
-	-	-	-	-	-	-	-	-	-	-	Belfast.
-	3	3	5	3	22	13	38	-	-	46	Coleraine.
-	-	-	-	-	-	-	-	-	-	-	Cork.
-	1	1	-	20	220	165	414	-	-	1,064	Drogheda.
-	-	-	-	-	1	1	2	-	-	2	Dublin.
-	-	-	-	-	-	-	-	-	-	-	Dundalk.
-	-	-	1	2	19	13	34	-	-	40	Dundrum.
-	-	-	-	3	9	9	21	-	-	126	Greenore.
-	-	-	-	-	-	-	-	-	-	-	Larne.
-	-	-	-	1	7	6	14	-	-	28	Limerick.
-	-	-	-	-	-	-	-	-	-	-	Londonderry.
-	-	-	-	-	-	-	-	-	-	1	Millford.
-	-	-	-	1	-	1	2	-	-	2	Mulroy.
-	-	-	-	-	1	-	1	-	-	1	Newry.
-	-	-	-	-	9	7	16	-	-	16	Portrush.
-	-	-	-	-	1	2	3	-	-	4	Rosslare.
-	-	-	-	-	-	-	-	-	-	-	Sligo.
-	-	-	-	2	45	46	93	-	-	102	Warrenpoint.
-	-	-	-	-	-	-	-	-	-	-	Waterford.
-	-	-	-	1	2	2	5	-	-	5	Westport.
-	-	-	-	-	-	-	-	-	-	-	Wexford.
-	4	4	6	51	364	326	741	-	-	3,902	TOTAL.

IV.

BRITAIN during the Three Months ended 31st MARCH, 1911, showing
in Great Britain.

SWINE.			Goats.	HORSES				Mules or Jennets.	Asses.	Total Animals.	BRITISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
-	-	-	-	1	-	9	10	-	-	1,385	Ardrossan.
-	-	-	-	1	4	6	11	-	-	1,083	Ayr.
-	-	-	-	-	-	-	-	-	-	-	Barrow.
-	-	-	-	-	6	9	15	-	-	17	Bristol.
-	-	-	-	-	-	-	-	-	-	-	Cardiff.
-	-	-	-	1	-	-	1	-	-	1	Falmouth.
-	-	-	-	4	53	52	109	-	-	110	Fishguard.
-	-	-	-	3	9	14	26	-	-	27	Fleetwood.
-	-	-	-	12	25	42	79	-	-	557	Glasgow.
-	-	-	-	-	3	4	7	-	-	7	Greenock.
-	-	-	-	1	5	10	16	-	-	17	Heysham.
-	-	-	1	22	219	232	383	-	-	405	Holyhead.
-	4	4	2	2	12	19	33	-	-	100	Liverpool.
-	-	-	1	-	-	1	1	-	-	2	London.
-	-	-	-	-	-	1	1	-	-	111	Manchester.
-	-	-	-	-	-	-	-	-	-	-	Newhaven.
-	-	-	2	-	18	6	24	-	-	23	Plymouth.
-	-	-	-	-	-	-	-	-	-	-	Preston.
-	-	-	-	-	1	1	2	-	-	8	Silloth.
-	-	-	-	-	2	2	4	-	-	9	Southampton.
-	-	-	-	2	5	4	19	-	-	85	Stranraer.
-	-	-	-	-	-	-	-	-	-	-	Whitehaven.
-	4	4	6	51	364	326	741	-	-	3,902	TOTAL

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, .	-	11	-	-	11	-	-	-
DUBLIN, .	4	-	-	-	4	-	-	-
TOTAL, .	4	11	-	-	15	-	-	-

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the
showing the PORTS of DEBARKATION

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, .	4	11	-	-	15	-	-	-

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, .	-	-	-	-	-	-	-	-
DUBLIN, .	-	-	-	-	-	-	-	-
TOTAL, .	-	-	-	-	-	-	-	-

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the
showing the PORTS of EMBARKATION

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, .	-	-	-	-	-	-	-	-

ISLE OF MAN during the Three Months ended 31st MARCH, 1911.
EMBARKATION in IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stallions.	Mares.	Geldings.	Total.				
-	-	-	-	-	1	-	1	-	-	12	BELFAST.
-	-	-	-	-	1	-	1	-	-	4	DUBLIN.
-	-	-	-	-	1	-	1	-	-	16	TOTAL.

ISLE OF MAN during the Three Months ended 31st MARCH, 1911,
in the ISLE OF MAN.

SWINE.			HORSES.					Total Animals.	ISLE OF MAN PORT.		
Fat.	Stores.	Total.	Goats.	Stallions.	Mares.	Geldings.	Total.			Mules or Jennets.	Asses.
-	-	-	-	-	1	-	1	-	-	16	DOUGLAS.

ISLE OF MAN during the Three Months ended 31st MARCH, 1911,
DEBARKATION in IRELAND.

SWINE.				HORSES.					Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.	Goats.	Stallions.	Mares.	Geldings.	Total.	Mules or Jennets.	Asses.	
-	-	-	-	-	-	-	-	-	-	BELFAST. DUBLIN.
-	-	-	-	-	-	-	-	-	-	TOTAL.

ISLE OF MAN during the Three Months ended 31st MARCH, 1911,
in the ISLE OF MAN.

SWINE.				HORSES.					Total Animals.	ISLE OF MAN PORT. DOUGLAS.
Fat.	Stores.	Total.	Cattle.	Stallions.	Mares.	Geldings.	Total.	Mules or Jennets.	Asses.	
-	-	-	-	-	-	-	-	-	-	-

COASTING AND

RETURN of the NUMBER of ANIMALS SHIPPED to and from Places in
the Places of Embarkation

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Cork to Aghada Pier, .	-	-	-	-	-	-	-	-	-	-	-
" to Belfast, .	-	-	-	-	-	-	-	-	-	-	-
" to Spike Island, .	-	-	-	-	-	-	-	-	-	-	-
" to Queenstown, .	-	-	-	-	-	-	-	-	-	-	-
" to Waterford, .	-	-	-	-	-	-	-	-	-	-	-
Total, . .	-	-	-	-	-	-	-	-	-	-	-
Aghada Pier to Cork, .	-	-	-	-	-	-	-	-	-	-	-
Belfast, " .	-	-	-	-	-	-	-	-	-	-	-
Spike Island " .	-	-	-	-	-	-	-	-	-	-	-
Queenstown " .	-	-	-	-	-	-	-	-	-	-	-
Waterford " .	-	-	-	-	-	-	-	-	-	-	-
Total, . .	-	-	-	-	-	-	-	-	-	-	-
Waterford to Ballyhack	-	22	-	4	26	-	-	-	-	-	-
" to Belfast, .	-	-	-	-	-	-	-	-	-	-	-
" to Duncannon, .	-	-	-	39	39	-	-	-	-	-	-
Total, . .	-	22	-	43	65	-	-	-	-	-	-
Ballyhack to Waterford	39	-	-	-	39	5	-	5	3	-	3
Limerick to Kilrush .	-	-	-	-	-	-	-	-	-	-	-
Duncannon to Waterford	177	5	-	25	207	60	-	60	213	-	213
Kilrush to Limerick, .	-	208	-	-	208	30	-	30	1,554	-	1,554
Banagher " .	-	-	-	-	-	-	-	-	-	-	-
Glin, " .	-	-	-	-	-	-	-	-	-	-	-
Portumna, " .	-	-	-	-	-	-	-	-	300	-	300
Kildysart, " .	-	-	-	-	-	-	-	-	4	-	4
Tarbert, " .	-	-	-	-	-	-	-	-	8	-	8
Total, . .	-	208	-	-	208	30	-	30	1,866	-	1,866
Belfast to Dublin .	-	-	-	5	5	12	-	12	-	-	-
Dublin to Belfast .	262	-	21	3	286	813	36	849	-	-	-
Londonderry to Moville	-	-	1	-	1	-	-	-	-	-	-
Moville to Londonderry	5	75	-	-	80	25	1	26	-	-	-
Ballina to Sligo, .	-	25	1	-	26	-	-	-	-	-	-
Belmullet " .	3	-	2	-	5	-	-	-	552	-	552
Total, . .	3	25	3	-	31	-	-	-	552	-	552
Sligo to Belmullet .	-	-	4	-	4	-	-	-	-	-	-
Lethbeg to Mulroy, .	-	-	-	-	-	-	-	-	-	-	-
Milford to Mulroy, .	1	-	-	-	1	-	-	-	7	2	9
Mulroy to Portrush, .	-	-	-	-	-	-	-	-	-	-	-
Londonderry to Mulroy	-	-	-	-	-	-	-	-	-	-	-
Total, . .	487	335	29	76	927	945	37	982	2,641	2	2,643

INLAND NAVIGATION.

Ireland during the Three Months ended 31st MARCH, 1911, showing
and Debarkation.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
-	-	-	-	-	-	-	-	Cork to Aghada Pier.
-	-	-	-	-	-	-	-	" to Belfast.
-	-	-	-	-	-	-	-	" to Spike Island.
-	-	-	-	-	-	-	-	" to Queenstown.
-	-	-	-	-	-	-	-	" to Waterford.
-	-	-	-	-	-	-	-	Total.
-	-	-	-	-	-	-	-	Aghada Pier to Cork.
-	-	-	-	-	-	-	-	Belfast "
-	-	-	-	-	-	-	-	Spike Island "
-	-	-	-	-	-	-	-	Queenstown "
-	-	-	-	-	-	-	-	Waterford "
-	-	-	-	-	-	-	-	Total.
-	-	2	1	3	-	-	26	Waterford to Ballyhack.
-	-	1	-	1	-	-	3	" to Belfast.
-	-	-	-	-	-	-	40	" to Duncannon.
-	-	3	1	4	-	-	69	Total.
-	-	-	-	-	-	1	48	Ballyhack to Waterford.
-	-	-	-	-	-	-	-	Limerick to Kilrush.
-	-	-	-	-	-	-	480	Duncannon to Waterford.
-	-	-	-	-	-	-	1,792	Kilrush to Limerick.
-	-	-	-	-	-	-	-	Banagher "
-	-	-	-	-	-	-	-	Glin "
-	-	-	-	-	-	-	300	Portumna "
-	-	-	-	-	-	-	4	Kildysart "
-	-	-	-	-	-	-	8	Tarbert "
-	-	-	-	-	-	-	2,104	Total.
-	-	1	5	6	-	-	23	Belfast to Dublin.
-	-	-	1	1	-	-	1,136	Dublin to Belfast.
-	-	-	-	-	-	-	1	Londonderry to Moville.
-	-	-	1	1	-	-	107	Moville to Londonderry.
-	-	-	-	-	-	-	26	Ballina to Sligo.
-	-	-	-	-	-	-	557	Belmullet "
-	-	-	-	-	-	-	583	Total.
-	-	-	-	-	-	-	4	Sligo to Belmullet.
-	-	-	-	-	-	-	-	Leithbeg to Mulroy.
-	-	-	1	1	-	-	11	Milford to Mulroy.
-	-	-	-	-	-	-	-	Mulroy to Portrush.
-	-	-	-	-	-	-	-	Londonderry to Mulroy.
-	-	4	9	13	-	1	4,506	Total.

RETURN of the NUMBER of HORSES EXPORTED from IRELAND through GREAT BRITAIN to the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 31st MARCH, 1911, showing the Ports of Embarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast,	—	215	145	360
Cork,	—	—	—	—
Dublin,	—	129	108	237
Dundalk,	—	142	103	245
Greenore,	2	231	102	335
Waterford,	—	65	87	152
Total,	2	782	545	1,329

RETURN of the NUMBER of HORSES IMPORTED into IRELAND through GREAT BRITAIN from the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 31st MARCH, 1911, showing the Ports of Debarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast,	—	—	—	—
Dublin,	—	3	—	3
Waterford,	—	—	—	—
Total,	—	3	—	3

RETURN of the NUMBER of HORSES IMPORTED into IRELAND direct from FOREIGN COUNTRIES during the THREE MONTHS ended 31st MARCH, 1911, showing the Ports of Debarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Dublin,	—	—	—	—
Portrush,	—	—	—	—
Total,	—	—	—	—

EMIGRATION FROM IRELAND.

TABLE showing, by Destinations, the Numbers of Emigrants (Natives of Ireland) who left the Ports of Ireland during the months of January, February, and March, 1911, and the total for the Three Months ended the 31st March, 1911, together with the total Number of Emigrants in each of the corresponding periods of the year 1910.

DESTINATION.	January, 1911.	February, 1911.	March, 1911.	Three Months ended 31st March, 1911.
FOREIGN COUNTRIES AND THE COLONIES :—				
America (U.S.), . . .	351	540	1,569	2,460
Canada,	68	110	756	934
South Africa, . . .	2	8	12	22
Australia,	56	37	56	149
New Zealand, . . .	27	2	10	39
Other Countries, . .	2	1	—	3
Total,	506	698	2,403	3,607
GREAT BRITAIN :—				
England and Wales, .	106	103	167	376
Scotland,	32	46	48	126
Total,	138	149	215	502
General Total for 1911,	644	847	2,618	4,109
General Total for 1910,	615	896	2,358	3,869

The figures in the above Table have been extracted from the monthly Returns published by the Registrar-General for Ireland.

The figures are subject to revision in the Annual Report.

ACCOUNT showing the QUANTITIES of certain kinds of AGRICULTURAL
into Ireland in each WEEK from

ARTICLES.	WEEK ENDED.				
	7th Jan.	14th Jan.	21st Jan.	28th Jan.	4th Feb.
ANIMALS LIVING—					
Horses, No.	-	-	-	-	-
FRESH MEAT—					
Beef (including refrigerated and frozen), cwt.	2,500	-	-	-	-
Mutton, " " " "	1,550	-	-	-	-
Pork, " " " "	-	-	-	-	-
Unenumerated, " " " "	20	-	-	-	-
SALTED OR PRESERVED MEAT—					
Bacon, cwt.	-	-	-	-	-
Beef, "	-	-	-	-	-
Hams, "	-	-	-	-	-
Pork, "	-	-	-	45	63
Meat, unenumerated, Salted cwt.	-	-	-	-	-
Meat, preserved otherwise than by salting (including tinned and canned), . . cwt.	6	-	-	-	11
DAIRY PRODUCE AND SUBSTITUTES—					
Butter, cwt.	-	-	7	-	-
Margarine, "	30	26	75	65	72
Cheese, "	-	1	-	4	-
Milk, Condensed, . . . "	39	81	58	55	59
" Cream, "	-	-	-	-	-
" Preserved, other kinds "	-	-	-	-	-
EGGS, gt. hunds.	696	612	336	396	384
LARD, cwt.	367	-	23	-	232
CORN, GRAIN, MEAL AND FLOUR—					
Wheat, cwt.	75,600	12,800	64,500	164,100	164,700
Wheat Meal and Flour, . . "	21,100	17,700	100	700	13,400
Barley, "	-	54,200	-	-	7,400
Oats, "	-	-	-	-	-
Pens, "	60	-	-	20	-
Beans, "	-	-	-	-	-
Maize or Indian Corn, . . "	603,700	312,700	177,300	488,800	162,500
FRUIT, RAW—					
Apples, "	-	-	-	-	-
Currants, "	-	-	-	-	-
Gooseberries, "	-	-	-	-	-
Pears, "	-	-	-	-	-
Plums, "	-	-	-	-	-
Grapes, "	-	-	-	-	-
Lemons, "	-	-	-	-	-
Oranges, "	-	-	-	-	-
Strawberries, "	-	-	-	-	-
Unenumerated, "	-	-	-	-	-
HAY, tons,	-	-	-	-	-
STRAW, "	-	-	-	-	-
MOSS LITTER, "	56	56	40	60	51
HOPS, cwt.	-	-	-	-	-
VEGETABLES, RAW—					
Onions, bushels,	500	1,390	1,340	2,230	100
Potatoes, cwt.	-	-	-	-	-
Tomatoes, "	-	-	-	-	-
Unenumerated, £	-	-	-	8	-
VEGETABLES, DRIED, . cwt.	-	-	-	-	-
Preserved by Canning, . . "	-	-	-	-	-
POULTRY AND GAME, . . £	-	-	-	-	-

* This Table is confined to the Imports of certain kinds of Agricultural Produce into
to a request from this Department kindly consented to separate the Irish imports (direct)
form of Weekly Returns.

**PRODUCE Imported direct (i.e., from the Colonies or Foreign Countries)
1st January to 31st March, 1911.***

WEEK ENDED						
11th Feb.	18th Feb.	25th Feb.	4th March.	11th March.	18th March.	25th March.
-	-	-	-	-	-	-
-	-	-	-	-	3,440	-
-	-	-	-	-	1,360	-
-	-	-	-	-	70	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	132	-	-
10	-	-	-	-	-	12
107	64	78	55	47	57	80
-	-	315	-	-	-	-
50	50	86	33	34	65	60
-	-	-	-	-	-	-
-	-	-	-	-	-	-
408	696	744	-	-	-	-
-	12	20	-	87	-	90
-	-	-	-	-	-	-
166,200	-	58,700	100,600	203,300	36,300	77,800
11,800	40,100	13,200	1,300	25,000	1,200	700
-	121,300	-	-	-	-	9,900
-	-	-	-	13,300	100	-
80	40	20	20	-	-	-
478,600	338,400	135,200	140,900	99,000	164,300	183,900
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
56	56	50	51	63	50	11
-	48	-	-	-	-	-
-	-	-	-	-	-	-
1,640	1,660	720	750	1,100	1,200	160
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

Ireland from the Colonies and Foreign Countries. The Board of Customs have in answer from those of the United Kingdom, and to supply this Department with them in the

Statistics and Intelligence Branch,
Department of Agriculture
and Technical Instruction for Ireland.

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DEPARTMENT OF AGRICULTURE
AND
TECHNICAL INSTRUCTION FOR IRELAND.

JOURNAL.

Meeting of the Council of Agriculture—Vice-President's Address—
Milk Production—Irish Crown Brand for Pickled Herrings
—Irish Table Duck Industry—Organisation of Agricultural
Women in Belgium—Salmon and Trout Culture—Fruit Crop
Report—Crop Report—Potato Blight—Marketing Early Potatoes
—Caerphilly Cheese-making in Ireland—Tobacco Growing in Ireland
—Growing Tobacco for Nicotine Purposes—Technical Instruction
in Clonmel—Weeds—Cultivation of Potatoes in Holland—National
Museum of Science and Art—Official Documents—Notes and
Memoranda—Statistical Tables.

ELEVENTH YEAR

No. 4.

JULY, 1911.



DUBLIN:

PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE.

To be purchased, either directly or through any Bookseller, from
E. PONSONBY, LTD., 116 GRAFTON STREET, DUBLIN; or
WYMAN AND SONS, LTD., FETTER LANE, LONDON, E.C.; or
OLIVER AND BOYD, TWEEDDALE COURT, EDINBURGH.

PRINTED BY

BROWNE AND NOLAN, LTD., 24 & 25 NASSAU STREET.

PRICE SIXPENCE.

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NOTICE.

Communications respecting the literary contents of this JOURNAL should be addressed to the Superintendent of the Statistics and Intelligence Branch, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin.

Communications respecting Advertisements should be addressed to ALEX. THOM & CO. (LIMITED), MIDDLE ABBEY-STREET, DUBLIN ; or to LAUGHTON & CO. (LIMITED), 8 WELLINGTON-STREET, STRAND, LONDON, W.C., and not to the DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

THE COUNCIL OF AGRICULTURE.

The Nineteenth Meeting of the Council of Agriculture was held on Tuesday, 30th May, 1911, in the Lecture Theatre of the Royal Dublin Society, Leinster House, Kildare Street, Dublin (by kind permission of the Council of the Society.)

The Chair was taken at 11 o'clock by the Right Hon. T. W. Russell, Vice-President of the Department.

The following were present :—

Representing the Department :—The Vice-President ; Mr. T. P. Gill, Secretary ; Mr. R. Cantrell, *i.s.o.*, Chief Clerk ; Mr. J. S. Gordon, Chief Agricultural Inspector ; Mr. T. Butler, Superintendent of the Statistics and Intelligence Branch ; Mr. J. P. Walsh, Clerk in Charge of Accounts ; Mr. J. D. Daly, Senior Staff Officer ; Mr. J. Wood ; Mr. John Hogan ; Mr. F. J. Meyrick ; Mr. H. G. Smith ; Mr. R. H. Lee, and Mr. E. O'Neill.

MEMBERS OF COUNCIL, ACCORDING TO PROVINCES.

LEINSTER.

Algernon T. F. Briscoe, *J.P.* ; Captain Loftus A. Bryan, *J.P.*, *D.L.* ; John Butler, *J.P.* ; Thomas J. Byrne, *J.P.* ; Thomas M. Carew ; Denis J. Cogan ; William M. Corbet ; James G. Dooley ; Robert Downes, *J.P.* ; Colonel Nugent T. Everard, *H.M.L.* ; Peter Ffrench, *J.P.*, *M.P.* ; William Field, *M.P.* ; Rev. T. A. Finlay, *M.A.* ; The Right Hon. Lord Frederick FitzGerald, *J.P.* ; James Galvin ; Patrick Hanlon ; Michael J. Horan, *J.P.* ; Patrick J. Kennedy, *J.P.* ; Nicholas B. King, *J.P.* ; Patrick A. Meehan, *J.P.*, *M.P.* ; Matthew J. Minch, *J.P.* ; Joseph Mooney, *J.P.* ; George F. Murphy, *J.P.* ; Charles H. Peacocke, *J.P.* ; William R. Ronaldson ; James Ross, *J.P.* ; Hugh Wallace.

ULSTER.

William Bailie ; Frank Barbour ; Harold A. M. Barbour, *M.A.* ; Hugh T. Barrie, *J.P.*, *M.P.* ; Rev. E. F. Campbell, *M.A.* ; Alexander L. Clark, *J.P.* ; Joseph Davison ; Robert T. Huston, *M.R.C.V.S.* ; John S. F. M'Cance, *J.P.* ; Thomas A. M'Clure, *J.P.* ; Captain John Patrick, *J.P.* ; John Porter Porter, *J.P.*, *D.L.* ; Colonel R. G. Sharman-Crawford, *J.P.*, *D.L.* ; Michael Sheils, *J.P.* ; William Smyth, *J.P.* ; Captain T. Butler Stoney, *J.P.*, *D.L.* ; Thomas Toal, *J.P.*

MUNSTER.

James Byrne, J.P. ; Captain William C. Coghlan, J.P. ; Thomas Corcoran, J.P. ; Edmond Cummins, J.P. ; Thomas Duggan ; Patrick J. Hogan, J.P. ; Michael Mescal, J.P. ; Patrick Moclair ; The Right Hon. Lord Monteagle, K.P., D.L. ; Michael J. Nolan, J.P. ; David Leo O'Gorman ; Hugh P. Ryan ; Michael Slattery ; George F. Trench, J.P.

CONNACHT.

P. J. Costello, J.P. ; Rev. Joseph G. Digges, M.A. ; Rev. Charles Flynn, P.P., V.F. ; John Galvin ; Rev. P. J. Manly, C.C. ; Rev. Philip J. Mulligan, P.P. ; Colonel John P. Nolan, J.P.

Mr. J. D. Daly acted as Secretary to the Meeting.

The minutes of the Eighteenth Meeting, 19th October, 1910, a copy of which had been sent to each member of the Council, were taken as read, and were signed as correct.

The Vice-President said that several members of the Council had written to express their regret that they were unavoidably prevented from attending the meeting as they were detained in the country owing to the progress of certain elections in connection with local bodies.

The Vice-President said that some members had expressed to him their opinion that the Council should be afforded an opportunity of giving their views on the National Insurance Bill at present before Parliament, in so far as it affected agricultural interests. No notice relating to the Bill appeared on the agenda paper, but as the matter was of great importance and urgency, he was not disposed to prevent discussion upon it. Accordingly, if any member desired to raise the question, he would accept a notice of motion to be discussed after the luncheon interval.

Mr. T. J. Byrne, J.P. (Co. Louth), thereupon gave notice that in accordance with the Vice-President's ruling, he would move a resolution on the subject after luncheon.

The Vice-President said that Mr. Campbell, Assistant Secretary in respect of Agriculture, was unfortunately prevented by serious illness from attending the meeting.

Mr. Hugh T. Barrie, J.P., M.P. (Co. Londonderry), thought that it would be the desire of every member of the Council that the Vice-President should be asked to convey to Mr. Campbell the sympathy of the Council and to express their hope that he would be soon restored to health and that the country would long continue to enjoy his valuable services.

This suggestion was unanimously approved.

The Vice-President delivered his address (*see pp. 598 et seq.*).

The Council proceeded to consider the following question which was submitted by the Department for discussion :—

“Milk Production : Can it be increased without detriment to other agricultural industries ? ”

The Council had before them a memorandum by Mr. Gordon, a copy of which had been sent to each member.*

After some discussion on the memorandum the following resolution was proposed by Mr. Thomas Toal, J.P. (Co. Monaghan), and seconded by Mr. John S. F. M'Cance, J.P. (Co. Antrim) :—

“That in consequence of a strongly expressed desire of the agriculturists of the country, we request the Department to use more energy in providing bulls from milking strains, and we recommend that in the live stock schemes and leaflets for the future more attention should be paid to the production of milk. Further, that the Departmental officials, when choosing premium bulls at the shows, should make known to the intending buyers the bulls which are from milking strains, and that a system of ‘selection,’ with a view to the produce of milk, should be pursued on the Departmental farms.”

Mr. P. J. Kennedy, J.P. (Co. Meath), suggested that the words “for dairying districts” should be inserted after the word “providing” in the resolution.

Mr. Toal accepted this suggestion.

After some further discussion, Mr. Gordon, at the request of the Vice-President, dealt with various points that had been raised in the course of the debate.

On the suggestion of the Vice-President, Mr. Toal asked leave to withdraw his resolution.

The resolution was accordingly, by leave, withdrawn.

The Council adjourned for luncheon at 1.45 o'clock.

The proceedings were resumed at 3 o'clock.

In accordance with the notice given earlier in the day, Mr. T. J. Byrne, J.P. (Co. Louth), proposed the following resolution, which was seconded by Mr. M. J. Nolan, J.P. (Co. Kerry) :—

“That this Council is of opinion that the National Insurance Bill at present before Parliament is not suited to the conditions that obtain in the rural districts of Ireland, and that the application of the Bill in its present form would cause a most serious injury to agricultural industries.”

After some discussion the Vice-President suggested that the resolution should be amended by inserting the words “while approving of the principle of the measure” after the word “Council” in the first line, and the words “in its present shape” after the word “is” in the second line. The resolution would then read :—

“That this Council, while approving of the principle of the

* See pp. 612 *et seq.*

measure, is of opinion that the National Insurance Bill at present before Parliament is, in its present shape, not suited to the conditions that obtain in the rural districts of Ireland ; and that the application of the Bill in its present form would cause a most serious injury to agricultural industries."

Mr. Byrne and Mr. Nolan accepted the Vice-President's suggestion.

The resolution as amended was discussed at considerable length and when put was adopted, a few members dissenting.

The following resolutions proposed by Colonel N. T. Everard, H.M.L. (County Meath), and seconded by M. J. Nolan, J.P. (Co. Kerry), were passed unanimously :—

(i.) "With reference to the important question discussed at the recent Poultry Conference, regarding the necessity of investigating diseases in poultry, this Council urge upon the Department the immediate need of carrying out research in this direction.

(ii.) "That, in view of the admitted fact that Poultry Keeping is a source of considerable income to the farmer, the Council urge the Department to give special attention to the development of Poultry Keeping among the occupiers of new holdings recently created under the Land Acts."

The following resolution proposed by Mr. William Field, M.P., and seconded by Rev. P. J. Manly, C.C. (Co. Leitrim), was passed unanimously :—

"That in the opinion of this Council it is of supreme importance to the agriculture of this country that every County Council in Ireland should co-operate with the Department in putting into force Part I. of the Weeds and Agricultural Seeds (Ireland) Act, 1909, which relates to the destruction of noxious weeds, and that we strongly urge those Councils which have not yet signified their consent to the issue of an Order under the Act, to do so at the earliest possible moment."

The following resolution proposed by Mr. William Field, M.P., and seconded by Rev. P. J. Manly, C.C. (Co. Leitrim), was passed unanimously :—

"That in view of the enormous injury done to the cattle trade by warbles, it is imperative that uniform action for the extirpation of this pest should be taken by all owners of cattle in this country, and that the Department should accordingly urge such owners to direct their efforts towards destroying the warbles in the backs of cattle by smearing rather than by attempting to prevent the warble fly from laying its eggs."

The following resolution which stood on the agenda paper in the name of Mr. William Field, M.P., was, by leave, withdrawn, the Vice-President having explained the regulations in force in regard to the export of in-calf cows.

"That we consider it advisable that the Department should arrange a practicable scheme to prevent the export of cows about to calve."

The following resolution was proposed by Mr. William Field, M.P., and seconded by Mr. John Butler, J.P. (Co. Kilkenny):—

"That the Department should arrange that when cows have been served by premium bulls at cheap rates, the calves of such cows should not be permitted to leave the country."

After some discussion the resolution was put and declared lost.

The following resolution proposed by Mr. Harold A. M. Barbour, M.A. (Co. Antrim), and seconded by Mr. John S. F. M'Cance, J.P. (Co. Antrim), was passed unanimously:—

"That considering the extent and value of the Flax industry, as well as its importance to the spinning and allied trades, the Department should increase their annual allocation in respect of schemes for the encouragement of flax growing."

The following resolution was proposed by Mr. Peter Ffrench, J.P., M.P. (Co. Wexford), and seconded by Mr. Charles H. Peacocke, J.P. (Co. Wexford):—

"That we call the attention of the Department to the want of accommodation for the fishermen's boats on the coast of South Wexford."

The Vice-President having explained the action taken by the Department with a view to securing improved harbour accommodation in County Wexford, Mr. Ffrench asked leave to withdraw the resolution.

The resolution was accordingly, by leave, withdrawn.

The following resolution was proposed by Mr. Peter Ffrench, J.P., M.P. (Co. Wexford), and seconded by Mr. Charles H. Peacocke, J.P. (Co. Wexford):—

"That the Inspectors appointed by the Department be instructed to see that where there is railway accommodation it shall be available for the transportation of pigs and cattle from fairs throughout the country to the port of embarkation without unnecessary delay."

After some discussion the resolution was, by leave, withdrawn.

The following resolution was proposed by Mr. William R. Ronaldson (Co. Kildare), and seconded by Mr. Patrick Hanlon (Co. Carlow):—

"That owing to the serious losses sustained by farmers through the worrying of sheep by dogs the Council take into consideration the best means of dealing with the matter."

The Vice-President explained the regulations in regard to dogs in Ireland, and the action taken by the various Local Authorities in the matter of putting the regulations into force.

Mr. Ronaldson thereupon moved and Mr. Butler seconded the following resolution:—

"That the dog tax in Ireland be increased to the same figure as in Great Britain with similar exemptions."

After considerable discussion Mr. Ronaldson asked leave to withdraw his resolution.

The resolution was accordingly, by leave, withdrawn.

The following resolutions proposed by Mr. Thomas Corcoran, J.P. (Co. Tipperary), and seconded by Mr. Michael J. Horan, J.P. (King's Co.), were passed unanimously :—

(i.) **"That the Department should pay special attention to the burning of lime and should encourage the manufacture of this material.**

(ii.) **"That field experiments should be carried out with the various forms of lime now in use in order to ascertain which is the best and most economical."**

The following resolution proposed by Mr. William Field, M.P., and seconded by Rev. Joseph G. Digges, M.A. (Co. Leitrim), was passed :—

"That this Council approves of the Meat Marking (Ireland) Bill recently introduced, and requests the Government to afford facilities for its passage into law this Session, and that copies of this resolution be sent to the Prime Minister, the Chief Secretary for Ireland, Mr. Redmond, M.P. and Mr. Lonsdale, M.P."

The following resolution proposed by Rev. Joseph G. Digges, M.A. (Co. Leitrim), and seconded by Mr. James Galvin (Co. Wicklow), was passed unanimously :—

"That in view of the alarming spread of a new Bee Disease in Great Britain, and in the interests of Irish Beekeepers, Horticulturists and Fruit Growers it is desirable that the Department should, at the earliest opportunity, obtain powers to prevent the introduction of any disease of bees to this country."

The following resolution proposed by Captain Loftus A. Bryan, D.L. (Co. Wexford), and seconded by Rev. Joseph G. Digges, M.A. (Co. Leitrim), was put and declared lost :—

"That the Department be again requested to devote more attention to American agricultural methods and machinery."

The following resolution proposed by Rev. P. J. Manly, C.C. (Co. Leitrim), was accepted by the Vice-President :—

"That this Council urge the Department to devise and carry out some general scheme by which tenants, receiving new tenancies in Congested Districts under the operations of recent Land Acts, may obtain financial aid towards stocking their farms and starting life under economic conditions."

With reference to the following resolution standing on the agenda paper in the name of Mr. P. A. Meehan, J.P., M.P. (Queen's Co.), the Vice-President said that the Department would adopt the suggestion as far as practicable :—

" That the present arrangement, under which papers on subjects submitted to the Council for consideration are read by an officer of the Department, shall be discontinued, and that in future all papers on subjects which are to be submitted to the Council for consideration shall be printed and supplied to each member of the Council at least three days before the date of meeting, in order that members may have sufficient time and opportunity to study the subject with a view of adequate investigation and discussion, which under the present arrangements are impossible."

The resolution was, accordingly, by leave, withdrawn.

The following resolution proposed by Mr. Patrick A. Meehan, J.P., M.P. (Queen's County), and seconded by Mr. Michael J. Horan, J.P. (King's County), was accepted by the Vice-President.

" That arising out of Resolution No. 4 adopted by this Council at the Meeting held on the 19th October, 1910, we request the Department to again press on the Government the grave urgency of dealing with the question of Arterial Drainage and that pending the passing of a Bill dealing with Arterial Drainage as affecting all Ireland, we request the Department to urge on the Government the favourable consideration of the Scheme submitted by the County Councils in the flooded area of the River Barrow, dealing with the annual destruction of property and injury to the public health of the county."

The Council adjourned at 5.50 p.m.

THE VICE-PRESIDENT'S ADDRESS.

MY LORDS AND GENTLEMEN,

The Department has now passed through its first decade. Our Tenth Annual Report has recently been issued. The institution has not yet entered upon its teens, but there are those among us who, keen to criticise, are anxious to know how far this great experiment in administration, initiated in 1900, has succeeded; and the question how far the Department has justified its existence, and how far the large expenditure upon it has been productive, is not at all irrelevant. I am, therefore, with those of our critics who think it is both desirable and possible to lift the veil to the uttermost inch and to show, if not where things actually stand, at least whither they are moving. Thirty or forty years of stubborn warfare have practically transformed a nation of agrarian insurgents into a nation of agricultural freeholders. This is a great achievement. Ten years of agricultural and technical education have uprooted old ideas and planted many new ones. A new rural civilisation is being built up, and we shall do well for a few minutes to take stock of our present position.

I do not dwell upon the work of the County Committees, in connection with which the Department spends something like £50,000 a year; the Counties, by means of a rate, contributing a somewhat lesser sum. This work constitutes the solid basis of the Department's functions. On the whole, it goes on smoothly and effectively. Patronage and pence are the chief difficulties. Every agency for good wants more money than it can get; and as regards patronage in this country—as elsewhere—a good many people are ever on the look out to do a good turn to a friend, even if it should be, as is often the case, at the expense of some public interest. This is human nature, and it is not peculiarly Irish. But the work of the County Committees is done before the eyes of the people who are immediately concerned. They see it in the local administration of the schemes for the improvement of live stock and horse-breeding and in the work of the instructors and others who are in their midst. Nor do I dwell to-day upon the great network of educational institutions spread over the country—the 46,000 students in our technical schools, the thousands of young men and women who are studying agriculture and rural economy in winter classes and in institutions of various kinds. All this is known and appreciated by everyone who takes an interest in educational and development work. Leaving these things aside for the moment, I pass on to the more direct work of the Department,

i.e., the work carried out from the centre. I wish to take you, as it were, into one or two of the bye-paths and to give you a lightning glimpse of what is being done—most of it outside and independent of the work of the County Committees.

THE CONGESTED DISTRICTS.

I begin with that western area which was so long the victim of neglect and worse. The picture I am about to sketch is one which speaks for itself, and one which ought to gladden every heart. It is the outcome of an ameliorative policy that was warmly challenged both in and out of Parliament, a policy which is being gradually worked out, and which has so far been amply justified by the results achieved. Take a little colony of migrants in Connaught. As a sample of migration and resettlement work it ought to encourage all who have struggled for the economic redemption of the West. Just a few miles outside Castlerea there are two small estates which, on being purchased, one by the Estates Commissioners, the other by the Congested Districts Board, have been turned into 27-acre holdings for between 30 and 40 families, transplanted from bog holdings in other parts of the country. New houses were erected by the two Departments named. The settlers brought little with them, and have now been at work for three or four years. With the provision of land and houses, and possibly, in some cases, with a small amount of working capital, these western peasants undertook their share of a great experiment. At this point the Department steps in. These men were not farmers in any real sense of the word. There is a big difference between cultivating 5 or 6 or even 10 acres of bog and 27 acres of virgin soil, or at any rate soil not cultivated since the Famine. The Department has planted an agricultural instructor or overseer in this district. This officer is one of 43 similar instructors working in such places in the West. He is a young man who has himself successfully managed a small farm, and by attendance at the winter agricultural classes of the Department has gained at least an elementary knowledge of scientific agriculture. He acts as the friend, adviser and counsellor of the new holders. The results so far in this typical instance of the policy—be it noted not of one but of three State Departments—are most satisfactory. Out-houses for pigs and poultry are being rapidly built by the people themselves. Gates and fences are being erected. From 3 to 10 acres of each holding are being cultivated. The people have combined by an unpretentious form of co-operation to purchase farm implements—ploughs, harrows, and mowers and reapers combined. Each man has a horse and a donkey. Two or three “beasts” was what the

people generally brought with them. The average now is 8 or 10. All the holders rear poultry, and there are families actually making from 12s. to 25s. a week on eggs. Neat enclosed gardens, most of them ablaze with flowers in summer, are the rule; and the houses are clean and healthy. The holders need capital, and, fortunately, in this special case, that can and will be provided. This picture of the new order of things is drawn from a report by our chief inspector, who has no enthusiasms apart from facts, and I have myself been over the ground twice and can verify every word of the report. Speaking the other day to one of the most influential and at the same time most critical of Englishmen who had been looking round the country for himself, I asked him what he thought of it all. "As a British taxpayer," he said, "I begin to feel satisfied that my money is not being lost. It is all admirable." This is but a sample of what is going on throughout the West. There are scores of places whose record is equally encouraging. Newspapers and public men exploited this country in days that are gone. The rags and woes, the sorrows and sins of Ireland were blazed far and wide, and it was probably necessary to do so in order to fix public attention on the facts. But there is not a tithe of the ardour, which was only too ready to portray our misery, available now to show a glint of the sunshine that has at last visited us.

VETERINARY DISPENSARIES.

Amongst the other activities of the Department in the Congested Districts there is the scheme of veterinary dispensaries, which has now been in operation since September last—a period of eight months. There are 26 Veterinary Surgeons subsidised in connection with it. Nine of the districts now covered had previously no means of obtaining veterinary advice, viz., Skibbereen, Castletownbere, Caherciveen, Swinford, Westport, Belmullet, Clifden, Manorhamilton, and Falcarragh (Co. Donegal). There are, unfortunately, still many districts where veterinary assistance is not yet available. It is gratifying, however, to be able to report that, in almost every one of the districts included, the scheme is being largely availed of by the small farmers. In one district the Veterinary Surgeon has dealt with 481 dispensary cases, or an average of 54 per month; in another 386 cases were treated, or an average of 42 per month. Well over 5,000 cases have already been treated under the scheme, and the reports which have been received go to show that taken all round it is fairly well appreciated by the small occupiers, for whose benefit it was initiated.

AGRICULTURAL CREDIT.

Before I pass from the Western area I may as well mention a matter in which the smaller farmers of Ireland are particularly interested. It is the question of Credit Banks. There is a notice of motion by Father Manly on the agenda relating to this subject, but as it may not be reached until a late hour, I will say now that the Department entirely concurs as to the need for a sound and satisfactory system of obtaining credit for agricultural purposes. In my address to the Council in November last I stated the Department's views on this question. Since that time these views have been strengthened by every day's experience. An Agricultural Credit system, under proper supervision and audit, and on a wider scale than that which now exists, is a pressing necessity, especially in those districts where new tenancies are being created. Without such a system the fruits of land legislation, which has cost so much in money and labour, are seriously delayed, and even imperilled; and, indeed, in some respects the security for the money advanced by the State is impaired. Up to the present the Treasury have not seen their way to sanction the Departmental Committee of Inquiry asked for, and have asked us to await the introduction of Lord Carrington's Bill, which has a similar object in view for Great Britain. The circumstances of the two countries are, however, wholly different. Their needs are widely dissimilar. There is the element of urgency in the Irish case, and I am in hopes that we shall before long be enabled to find out by means of a strong Committee what is necessary and what can with safety be attempted.

THE FLAX INDUSTRY.

Let me now give you another instance of useful work which is being done without any noise. The Departmental Committee on the Flax Industry has reported since our last meeting. The changes recommended do not, to any appreciable extent, involve legislation, and are of such a character that the majority of them can be effected—and are being effected—by cordial combination between the Department and the people concerned. I note and welcome Mr. Harold Barbour's notice of motion on the agenda for to-day, but how many people are aware of what is being done to promote the flax industry? Last year was, of course, a record one both as regards crop and price. But the area under cultivation is being still further extended. Forty or fifty years ago, for example, there was a flourishing flax industry in County Cork. Up to three or four years ago the tradition still lingered in certain districts, but

little or no flax was grown. The industry had practically died out. The acreage in Cork under flax since 1907 stands thus:—

1907,	..	..	..	about	70	acres.
1908,	..	..	..	„	120	„
1909,	..	..	..	„	160	„
1910,	..	..	..	„	300	„
1911,	..	..	..	„	400	„

How has the change come about? How was the impulse given that led to the restoration of this industry in the South? The impulse was given in the simplest possible way—a passing visit to Cork on other business—an interview with two gentlemen interested in the industry—two scutch mills put in order, at a trifling cost, by the Department—an instructor from the North appointed; and the cultivation of this beautiful and profitable crop, with all its offence to the olfactory nerves, is now, let us hope, firmly re-established in Munster. The only difficulty in regard to the wide extension of the industry is, it appears to me, the question of an adequate labour supply. County Mayo, with a similar tradition, is already, and under the same circumstances, falling into line with Cork. A similar course of action is being adopted—the repair of disused mills and the appointment of a qualified instructor. This year about 100 acres have been sown, and the district around Ballycastle will witness a great effort to revive the flax industry where it had totally disappeared. County Sligo will probably follow suit next year. The importance of this new development cannot be overrated. The flax crop is a profitable one, and its cultivation involves large employment.

SEEDS, MANURES, AND FEEDING STUFFS.

Seed testing, as you are aware, is numbered among the Department's operations. A rather remarkable result in this connection has followed legislation which we recently secured with a view to improving the quality of our seed supplies. It will be within your recollection that in the Session of 1909 I was fortunate enough to get a Bill dealing with Weeds and Seeds through Parliament. Both in and out of the House more attention, very fortunately, was paid to the weeds than to the seeds part of the measure; but under the Act the Department has already been able to bring about what may almost be called a revolution in the supply and sale of seeds in Ireland. This is a question which has had the careful attention of the Department for years, but until the Act of 1909 was passed very little could be done to remedy what was really a

deplorable state of affairs—inferior seeds of all kinds being dumped down in Ireland, especially in the Western area. Under the Weeds and Agricultural Seeds Acts the Department was authorised to take samples everywhere, to have these tested both as regards germination and purity, to warn the wholesale and retail seedsmen where the seed was bad, and to placard persistent offenders and their wares all over the country. No powers of prosecution were asked for and none were given. During the last year the Department proceeded tentatively in putting the Act into operation. Upwards of 900 samples of seed were taken, and the result in the large proportion of those tested indicated that about 65 per cent. were distinctly unsatisfactory. Notice was accordingly given to the purveyors of these inferior seeds, and warning circulars were issued to every retailer of seeds in Ireland. Thereupon the wholesale trade, awaking to the powers conferred upon the Department, challenged the analyses of our Seed Testing Station, putting against them those of seed testing stations at Copenhagen and Zurich. The matter was brought to an issue in March last, when a deputation representing English, Scottish, and Irish seed-houses waited upon the Department. The whole question was fully threshed out. The cause of the disparity between the results of the tests carried out by the Department and those conducted at these foreign stations was speedily made apparent. The Department tests the seed as it comes from the bag, and as the farmer buys it. The Continental experts test “cleaned seed,” i.e., seed which has had the impurities and imperfect seeds removed. Of course, the results differed. The testers were not dealing with the same thing. The seed merchants and retailers are now fully aware of the requirements of the Department, and we intend fully to utilise the powers which have been conferred upon us in this matter. It is high time that the supply of seeds of an inferior quality should be stopped. These observations apply to manures and feeding stuffs as well as to seeds, and active successful steps have been taken under the Fertilisers and Feeding Stuffs Act against fraud in the preparation and sale of those commodities. Valuable results are being obtained from the effective administration of these and other Acts dealing with adulteration and misdescription. Our officers already report a distinct change for the better as regards seed. It is truly a titanic struggle, but the advance made is extremely satisfactory when the difficulties that have to be surmounted are considered. I notice that a Bill has been introduced into the House of Lords one of the objects of which is the repeal of the provisions relating to seeds in the Weeds and Seeds Act. We shall take care that Lord Clinton’s Bill receives the attention it requires!

As regards the weeds section of this Act, in connection with

which Mr. Field has a notice of motion on the agenda paper, I reported at our last meeting that 16 County Councils had passed the necessary resolutions enabling the Department to put its provisions into force in their respective counties. Seventeen counties still remain outside. As it has been shown that the Act works without friction and with beneficial results in those counties in which it has been adopted, I hope the remaining County Councils will shortly decide to follow the example thus set. The work of inspection being performed by officers specially appointed for the purpose by the Department, no part of the cost of administration falls upon the local authority.

THE DEVELOPMENT COMMISSION.

I am now in a position to report the result of the negotiations which the Department has been for some time carrying on with the Development Commissioners. The Council will remember that, when the Development Act passed, the Department applied for grants in respect of four subjects—Horse-breeding, Forestry, Fisheries, and Research. The application made was for £240,000 spread over a period of five years. Our efforts have had a fair measure of success in regard to three of these subjects.

For Horse-breeding the sum of £10,000 was granted for the first year. This has been expended on approved schemes, i.e. (1) Two-fifths for the purchase of stallions ; (2) Two-fifths for the award of additional nominations under the Department's general horse-breeding scheme ; and (3) One-fifth for the purpose of an Irish Draught Horse Scheme, which the Department had in contemplation at the time of making the foregoing application.

For Forestry £25,000 have been granted, and, with the concurrence of the Treasury, £17,000 of this sum will be placed on the estimates for expenditure during the current year. The Department will thus be able to purchase land and commence planting operations. This grant does not affect the Treasury allocation of £6,000 a year for the purpose of the purchase of woods under the Land Act of 1909.

For Fisheries, while our application under this head was for £50,000, spread over five years, we made so good a case that £54,000 were voted ; and, subject to Treasury sanction being given, we shall speedily have the difficult task of allocating this large sum to the most advantageous places for pier and harbour improvement. Perhaps I ought to mention that this grant includes money for a new dredger—which has already been purchased—suited to the requirements of our smaller harbours. The Department's application in respect of Fisheries did not cover the seaboard of the Congested

Districts, the Congested Districts Board making a separate application for this area.

The question of a grant for the purposes of scientific research still stands for consideration. In some respects it is the most important of our needs. Diseases in animal and plant life abound, and it is absolutely essential that the State Department dealing with agriculture should have the means of studying these diseases with a view to their prevention. The whole case for Ireland in this connection is before the Commission, and will be pressed with all the power of the Department.

There is yet another matter in connection with the Development Commission to be noted. The Tobacco Growers' Association, desiring to get assistance from the Commissioners, discovered that they, as a trading body, were not eligible for a grant, and that aid to this industry, if given at all, must be given through the Department. I felt some difficulty about pressing this item. In the first place, the Department, as is well known, had arranged with the Treasury for a grant of £6,000 per annum for five years in order that a tobacco-growing experiment should be fairly tested. Secondly, there was the difficulty that, although great progress had been made, in the cultivation of tobacco, the Department was not in a position to pronounce definitely upon the object of the experiment, i.e., whether there was a probability that the industry could ultimately be conducted upon a commercial basis. The Chancellor of the Exchequer having, however, stated in the House of Commons that he would be glad if the Development Commission saw its way to supplement the Treasury grant for this purpose, it has been decided to make an application to the Commissioners setting out the facts so far as they are at present available. When the Commissioners decide upon the application, if a grant is forthcoming, the question of how to use the money to the best advantage, and under what conditions it should be spent, will be immediately considered.

Perhaps I ought to add that questions have been asked in and out of Parliament as to the introduction of the Sugar Beet industry into Ireland. Some years ago this matter was fully considered and certain experiments made. As a result the Department arrived at the conclusion that the industry was not in many respects suitable to this country, and further consideration of the subject has confirmed this opinion.

FORESTRY.

As regards our existing forestry operations, the negotiations for the purchase of lands out of the Annual Vote of £6,000 provided on the recommendation of the Departmental Committee on Irish

Forestry have been continued. Under this Vote the Department is limited to the acquisition, subject to the payment of ordinary purchase annuities, of forest areas in estates coming under the Land Acts. Areas amounting to a total of 6,000 acres have been acquired in this way. They are situated in the following Counties :—Cavan (400 acres), Londonderry (250 acres), Tyrone (450 acres), Queen's County (1,900 acres), Wexford (650 acres), Tipperary (1,200 acres), and Galway (1,300 acres). Arrangements for taking over two additional properties, one in Galway (450 acres) and one in Clare (400 acres), are almost complete. This will raise the total area of the Department's forest lands to 7,000 acres. It is estimated that the whole of the £6,000 mentioned will be required for the payment of annuities and the working of this area on approved lines, so that no further properties, I fear, can be acquired under this Vote. However the Development Commissioners, as I have already reported, have allocated a sum of £25,000 for the purchase by the Department of lands for afforestation; and they have also promised to consider applications for funds for the maintenance and development of woodlands acquired by County Councils under the Land Purchase Acts.

Several County Councils have favourably considered the suggestion made last year by the Department in regard to the institution of local schemes for dealing with suitable areas which are too small for inclusion in the Department's central scheme. Kildare and Westmeath have already schemes in successful operation. On a recent visit to Kildare I was informed that the farmers who had purchased their land were now planting trees, and that over 100,000 had been put down in the county during the year. Other County Councils have deferred the adoption of schemes pending information as to what assistance would be forthcoming from the Development Fund. I again commend the matter to the favourable consideration of these local authorities.

WINTER AGRICULTURAL CLASSES.

The system of winter agricultural classes developed apace during the past season. It was in operation in 27 counties, classes being formed at 78 centres to which 1,840 students were admitted. All the counties which adopted the scheme in 1909-10 continued it, with the exception of Westmeath; and Cavan and Kerry started it for the first time. The majority of the counties where only one instructor was available held two or three classes weekly; but Limerick, Mayo, Tyrone, and Kilkenny each established 5, and Cork 13 classes. Additional instructors or special teachers were employed in these latter counties. The average attendance of

students would appear to have improved somewhat, despite the fact that the percentage of students coming considerable distances was much increased. As an instance of the distances covered I may mention that 85 of the 68 students admitted to the two classes held in Tipperary (North Riding) travelled daily on the double journey a distance of 20 miles or more. Three County Committees provided scholarships tenable at the Clonakilty and Ballyhaise Agricultural Stations for the best students at the winter classes, and 10 scholarships were awarded for the session 1911-1912.

ULSTER DAIRY SCHOOL.

While I am on the subject of agricultural education, I may mention that the large demand for admission to the Ulster Dairy School has necessitated an extension of the school buildings. The additional accommodation which has been provided includes a dormitory for 20 pupils, a new teaching kitchen, an ironing room, a dining room, a recreation room, and bath rooms. From the opening of the session beginning in July next, 50 resident pupils will be received instead of 30 as at present.

DEAD MEAT TRADE.

The question of developing a dead meat trade is now well in hand. In the counties of Wexford and Louth societies have been formed for the purpose of exporting meat to London. In each case the Department has approved of assistance being given by the County Committees of Agriculture in the initial stages of the industry. Arrangements for the building and equipment of a suitable abattoir have been made by the County Wexford Society and consignments are being sent regularly to Smithfield market. The Louth Society are also making arrangements to build an abattoir; but in the meantime they have made a successful start and have had a qualified butcher employed since early in January, the work of slaughtering being carried on at the abattoirs of local butchers in Drogheda. About 20 cattle are marketed each week, and the prices received have been so far satisfactory. The London salesmen disposing of the meat speak very highly of its quality.

THE POULTRY CONFERENCE.

The important conference on the poultry industry which was held early in May was a most gratifying success. It was convened by the Department in co-operation with the Board of Agriculture and Fisheries and the various organisations in Great Britain and Ireland connected with the poultry industry. There has been a

marked decline within recent years in the foreign supplies of eggs and fowl, and the object in view was mainly to draw attention to the opportunity thus afforded to the home producer. Ireland being the chief supplier of these commodities to the British markets is especially concerned in the present situation. Papers were contributed by experts on subjects such as poultry instruction, the promotion of poultry-keeping, and the organisation and distribution of produce. The proceedings were reported in the daily Press both in Ireland and across the Channel, also in the trade and agricultural journals. A report of the conference is being prepared, and will be widely distributed. The Department has reason to believe that the conference thoroughly fulfilled its object, and that the publicity given to Ireland as a producing country will lead to a considerable development of the Irish poultry industry in the future.

THE EXPORTS OF BUTTER.

There is one subject, and one only, which mars the congratulatory note of my message to the Council to-day. I have nothing to say of a hopeful or reassuring character as regards the Irish butter industry. To-day our butter export is lower than it was seven years ago. The fall during the past four years—1907-10—has been continuous, and amounts in value to over £424,000. The pressure of special work in Parliament prevents all idea of a contentious measure dealing with this industry being considered or passed by the House of Commons at present, and I regret to say that I have had to abandon the idea of being able to secure an agreed or non-contentious Bill—although I have gone great lengths and abandoned many valuable points to achieve this end. The Bill will have to be faced. It will have to run all the risks of a contentious measure. Meanwhile adulteration goes on apace. An enormous trade in margarine, sold as Irish butter, is carried on throughout the three kingdoms. Detection is difficult. Magistrates in many places appear to look upon prosecutions to protect the poor as of little importance; and the profits are so great that the fines usually imposed do not act as a deterrent. Alongside of this fraudulent traffic a number of creameries supply foreign and in some cases ordinary farmer's butter during the winter months as "Irish Creamery." This lowers the character and the price of the genuine article. Indeed a number of creameries are registering as butter factories in order that this trade may be carried on within the law. Some of them, again, openly defend blending and re-working as legitimate operations, though both of these processes are fatal to the central idea of the creamery system. Hence I am not surprised that the butter export should fall. English merchants can get foreign butter without

sending to Ireland for it. They can get factory butter without paying creamery prices. I know it is said that the reason the exports have fallen is that we are consuming the creamery butter at home. If this contention were true I should expect to see the import of foreign butter declining. But the tendency here is upward, while our exports fall. What happens in such a case is seen if we refer to the pig trade. The export of pigs has declined, seriously declined. But the decline in the imports is still more marked, the fact being that the high price of bacon at home has resulted in the home-produced article being retained for consumption. The facts are altogether different in the case of butter. Gentlemen, what the butter industry requires is (1) a system of all the year round dairying, and (2) a little more honesty—more straightforward dealing. If the public in Great Britain or in Ireland desire to have Irish creamery butter, even if they have to pay a high price for it, they have a right to get it and not something else! No butter producer—be he creamery proprietor, farmer, or factory proprietor—has a right to supply another article than that which the consumer desires and for which he pays. In my judgment the butter industry and the country are paying a high price for the delay in legislation—delay which I am bound to say is due solely to one branch of the industry.

FISHERIES.

I have already referred to the grant of £54,000 made by the Development Commissioners for pier and harbour improvement work and for the purchase of an additional dredger. This is a step forward in the right direction. Another is the appointment early this year of the Departmental Committee on Irish Inland Fisheries, which is at present sitting under the chairmanship of Sir David Harrel. The general work of the Fisheries Branch is well maintained.

SUPPLY OF FRESH FISH IN INLAND TOWNS.

The Department has during the last few years given attention to the supply and sale of fresh fish in the inland towns of Ireland. It may be of interest if I state that our agents have visited 130 inland towns and made the necessary arrangements with salesmen. In about 105 cases developments have resulted. To illustrate the progress that has been made I need only mention that the salesmen in towns on the Great Southern and Western Railway system are able to dispose of some 500 boxes weekly, while during the herring season very large quantities are sent to the northern towns.

MOTOR BOAT FISHING.

The change which is taking place in the condition of the fishing industry owing to the introduction of steam and motor power in fishing boats has on several occasions been brought under your notice. The greater part of the development of motor boat fishing has so far been in the Arklow district, but loans for the purchase of motor engines have been issued for other parts of the coast. Existing boats have been adapted in some instances, but in the majority of cases new boats have been built. The cost of these boats, fully equipped with engines and capstans, is from £700 to £1,000. Twenty-one large boats have been equipped, and loans amounting to £13,000 have been issued by the Department to assist in their construction. Twenty-eight small motor boats have also been fitted out, involving the issue of loans amounting to £2,700. In order to ensure the proper maintenance of the engines a system of inspection has been arranged by the Department. One crew in Arklow recently determined to go a step further, and have a steam drifter built. This vessel, which has just been delivered, was built in Arklow and engined on the Clyde. It is the first steamer ever built in Arklow, and the first steam drifter built anywhere in Ireland.

MACKEREL CURING.

For over twenty years the curing of mackerel for the American market has been one of the most important branches of the Irish fisheries. Prices have, however, dropped so seriously within recent years as to render a profitable trade impossible. A number of Norwegians have curing stations on the Irish coast. The fish put up by them average a higher price in the American market than the Irish product. The Department, therefore, determined recently to try an experiment in the curing of mackerel on a considerable scale and engaged a Norwegian curer to give instruction and put up fish according to the Norwegian method. The experiment is now under way, and it is hoped that the results will be satisfactory.

CROWN BRAND FOR IRISH HERRING.

Within the last few years herring curing has been resumed in Ireland, and, as the herring caught on the east coast is suitable for branding, a demand has been pressed upon the Department to provide a crown brand similar to that used in Scotland. Such a brand is difficult to administer, and is worth nothing if its credit be not maintained. With the valuable assistance of the Scottish Fishery Board, which for a great number of years has administered the crown brand for herring in Scotland, the Department have

made arrangements to establish an Irish brand. The experiment of applying it will be made during the next season at one or two places on the east coast under the supervision of skilled officers.

This, gentlemen, brings my address to a close. It has been almost entirely confined to stating and explaining the character of the work directly carried on by the Department at the centre. I think I have indicated enough to convince you that no effort is being spared, no opportunity neglected, to further the development of that great agricultural industry upon which Ireland must in the future mainly depend.

MEMORANDUM ON MILK PRODUCTION.

CAN MILK PRODUCTION BE INCREASED WITHOUT DETRIMENT TO OTHER AGRICULTURAL INDUSTRIES ?

Submitted by Mr. J. S. Gordon, Deputy Assistant Secretary in respect of Agriculture, for the purposes of discussion at the Meeting of the Council of Agriculture on the 30th May, 1911.

This is a subject of the greatest importance to all Irish farmers at the present time, because since the year 1907 there has been a considerable decrease in the output or export of dairy produce from this country. The value of the total export trade in dairy produce consisting of butter, cheese, cream, condensed and separated milk was £4,380,316 in 1907, and £4,027,812 in 1909, the last year for which the statistics are available. Thus, in two years' time there has been a decrease of £352,504. If we examine the following figures in detail it will be seen that the decrease is not due to falling prices, but to a reduction in the quantity of produce.

I have taken the figures for the years 1907 and 1909 :—

			1907	1909
			<i>Cwts.</i>	<i>Cwts.</i>
Butter,	..	..	818,004	719,625
Separated milk,	..	..	5,418	1,605
Condensed milk,	..	..	290,183	274,842
Cheese,	..	..	2,460	4,015
Cream,	..	..	6,058	10,351
Butter has	<i>decreased</i>	almost	..	100,000 cwts.
Separated milk	do.	about	..	4,000 ..
Condensed milk	do.	..	..	15,340 ..
Cheese has	<i>increased</i>	..	..	1,550 ..
Cream	do.	..	..	4,000 ..

The decrease in the export trade, as shown by the recorded figures, has been attributed to the following causes :—

SOME SUGGESTED CAUSES OF THE DECLINE.

A much larger consumption of milk and butter at home ; the increased development in the parcel post trade in private consignments of small quantities of butter to Great Britain (statistics of which are not available) ; the scarcity of labour ; the spread of abortion amongst dairy stock ; the influence of premium bulls ; the sale of the best cows and heifers to exporters ; the annual slaughter of good milch cows when sold by town dairymen at the conclusion of a year's milking period.

I do not intend to examine into these causes now. Most of them undoubtedly have some influence on the annual output, but few of them have been investigated sufficiently in detail to enable one to draw reliable conclusions. The Department are, however, giving all these supposed causes careful consideration.

Is it not possible that this decrease may be due to an increase in another branch of the cattle industry? On examining the export figures for cattle for the past five years it will be found, by comparing the years 1905 and 1909 that the number exported has increased by 88,649, and the value has risen by £1,823,297; while in 1910 the number of calves reared shows an increase of close on 20,000 as compared with 1909. Both these facts seem to point to more young cattle being reared. It would, therefore, be reasonable to assume that more milk is being used for the rearing of calves and less for manufacture into butter, and this would partly explain the decrease in the export of dairy products.

CAN MILK PRODUCTION BE INCREASED?

This brings me to the question: Can we increase the present milk production? It is worthy of consideration, not only because it affects the output of butter, but because two other industries are largely dependent upon milk, viz., the rearing of calves, upon which the store trade depends, and the rearing and feeding of pigs. It has been proved conclusively by the experiments carried out by Mr. Duncan at Clonakilty Agricultural Station that pigs can be most profitably reared and fed where milk forms portion of their food ration.

The total number of milch cows in Ireland in 1910 was 1,470,972. It has been estimated that the average milk yield of each cow does not exceed 400 gallons per annum; and if we take the value of the milk at 4½d. per gallon it would realise £11,032,290. If this yield could be increased by 200 gallons per cow, it would mean, on the same valuation, a monetary increase of £3 15s. per cow, or a total annual gain to the country of £5,516,145. Is it possible to increase the average yield by 200 gallons? What has been accomplished in this respect in other countries should be quite possible in Ireland, where the soil and climate compare more than favourably with those of any other country for dairying.

For some years past considerable attention has been devoted to increasing the production of milk per cow in the following countries:—Holland, Denmark, Sweden, Germany, Canada, the United States, and Scotland. This has been done through societies of farmers, who have either raised the necessary funds themselves, or, as in several instances, have secured financial assistance from

the State; and in all these countries the movement has been wonderfully successful. In some districts in Sweden where these societies have been operating for nine years the increase in yield per cow has gone up by 200 gallons; and in Holland the average yield from one hundred thousand cows in the province of Friesland has been raised to 840 gallons per annum. In Denmark, on the Island of Funen, there are 142 cow-testing societies which commenced keeping records in 1899 with 3,464 cows giving an average yield of 663 gallons. In 1909 the number of cows registered had increased to 40,788 with an average yield of 747 gallons, an increase of 84 gallons per cow.

It has been proved in Ireland by those who keep milk records under the Department's Dairy Cattle scheme that there are many cows which give a yield of from 600 to 1,200 gallons. This shows clearly that if the average for the whole country is only 400 gallons per annum, there must be hundreds of cows giving very much less than 400 gallons each, or, in other words, there must be a large number of cows which do not pay for their keep, and which, therefore, are mere pensioners on the farm.

MILK RECORDS.

It is evident that these unprofitable cows should be got rid of, but they must first be identified. This can be done only by weighing at certain intervals—say, every week on a particular day—the milk of each cow in the herd, morning and evening, from the time she calves until she goes dry, and calculating from these weights the total annual yield, or by what is known as keeping milk records. By this means farmers are enabled to determine which animal pays and which is being kept at a loss. The keeping of such a record is comparatively simple, as it involves a very small cost and hardly any labour.

BUTTER FAT.

But it is sometimes the case that although a cow may give a large quantity of milk yet the milk will not produce a high yield of butter; or, in other words, it is poor in butter fat. It is, therefore, equally important to ascertain the percentage of butter fat which each cow's milk contains. Approximately accurate information on this point may be obtained by taking samples of each cow's milk once a week, in the morning and in the evening—mixing them together and preserving them until the end of the month, when the composite sample should be tested for butter fat.

It is quite as necessary to weed out those cows that give milk

with a small percentage of butter fat as those that give a small quantity of milk.

DAIRY CATTLE REGISTER.

The Department's Dairy Cow Registration scheme has been in operation since 1906. There are at present 1,158 cows registered or being tested ; the average milk yield is 716 gallons, the maximum being 1,469, and the minimum 500 gallons. Of course, these are selected cows, and are not to be taken as representing the average dairy cattle of the country. They are selected to form the basis of the Department's dairy herd register, and are chosen for conformity as well as for their yield of milk. The records under this scheme are being kept by private individuals, and the Department during each season inspect each cow several times, have the milk weighed, the records checked, and samples taken to be tested for percentage of butter fat, but as these 1,158 cows are scattered all over Ireland, comparatively few being in any one district, the cost of inspection is high.

COW TESTING ASSOCIATIONS.

The work could be carried out much more economically in districts where creameries are established or where dairy farming prevails, if in the one case the creamery society constituted themselves into a cow testing association, and if in the other a number of farmers interested in such a movement formed themselves into a society, each member of which would undertake to keep records of all his cows. The secretary of the creamery might be appointed to act as secretary of the association, to inspect occasionally the milk records kept by each member and to test milk samples, or one of the members of the association might be selected to fill this position.

In 1910 the Department started a cow testing scheme, which differs from the dairy herd register. In the former the milk of all the cows in the herd must be weighed and tested for percentage of butter fat. In the latter only those cows which give a yield of 500 gallons and upwards and not less than 3·5 per cent. butter fat are entered. Nine societies have already been formed, which are prepared to test 1,165 cows, and each society will get a small subsidy from the Department to assist in paying their secretary or manager.

SELECTION AND RETENTION OF BEST FEMALES.

Another great advantage gained by keeping records is that it enables those who own the animals to determine which cows to keep and from which they should breed and retain the heifer calves. It usually follows that if a cow is a good milker her female progeny

will be similar. A good milking herd can be built up only by selecting the best milking animals and breeding from them. It is astonishing what can be accomplished in a few years by adopting such a course. As one of several instances where this course has been adopted, I may quote the results achieved in a private dairy herd owned by Mr. John Evans, Burton, Lincoln. In 1890 he started to keep records of the milk yield of 31 cows. During that year the average yield per cow was 740 gallons. In 1909 the average yield of 51 cows was 838 gallons, an increase of practically 100 gallons per cow.

SUBSIDISING THE BEST FEMALE STOCK.

It has been suggested that the Department should give a subsidy to farmers to induce them to keep their best cows and heifers, especially those served by, or the progeny of, premium bulls, in order to prevent these animals from being exported. Let us see if such a suggestion is practicable. We have two classes of farmers to consider—(a) the man with limited capital who must sell his cattle in order to raise money to meet his most pressing demands, and (b) the man who can afford to keep his best animals for stock purposes. In my opinion no *reasonable* subsidy will induce the former to retain his most saleable animals; and the latter should require no subsidy as an inducement: it is entirely a question of convincing him that it would be to his advantage to retain his best females as a breeding stock—a matter simply of education.

Further, would a subsidy be reasonably possible? The subsidy would have to be of sufficient amount to prevent the needy man selling his best animals—at least £5 per animal. Now, last year there were 1,052 premium bulls in Ireland, and if we calculate that each bull serves 50 cows, which produce 20 heifer calves, and that a subsidy of £5 is to be paid for each heifer if she is retained in the country, this would mean a sum of £100 per premium bull, or a total of £100,000 per annum for the female progeny of 1,000 bulls. This sum would absorb practically the entire amount which the Department have for financing *all* the agricultural schemes. In addition, provision would have to be made to meet the enormous cost of administering such a scheme. Animals would have to be inspected and marked, and even when that was done what effective check could the Department or County Committees apply to prevent the animals being sold and exported?

INFLUENCE OF THE BULL.

Attention should, however, be paid to the selection of the bull even when breeding for milk. The sire undoubtedly has an in-

fluence upon the milking properties of his female progeny, but how far that influence does affect his stock it is impossible to say, as no records of experiments have as yet been published which afford sufficient accurate details to warrant a definite opinion being expressed on the subject. We know that some male animals have greater powers of prepotency as sires than others, and that some bulls produce better milking heifers, with better developed udders, than other bulls, but how far this is attributable to the ancestry of the bull it is difficult to determine. I believe that the bull has an influence on the milk-producing properties of his female offspring, but I do not believe that a bull with a milking pedigree or one sprung from animals that are good milkers on both sides will, if mated with cows giving a small yield of milk, produce heifers which will give a large yield. My opinion is that unless the dam gives a large quantity of milk you can hardly expect her heifers to be good milkers.

DEMAND FOR BULLS OF MILKING PEDIGREE.

Within recent years there has been a steady and increasing demand for bulls of milk pedigree, not alone in Ireland but in England, especially in districts where milk is being produced either for sale or for manufacture into butter. During the last three years there have been many inquiries throughout Ireland for this class of bull, and to meet the demand the Department started the Dairy Cattle Register. In 1909 there were selected for premiums 8 dairy bulls the progeny of registered dairy cows; in 1910 there were 20; and 23 in 1911. The Department this year received quite a number of applications for bulls of this type from farmers who were willing to pay in some instances as high as 60 guineas for a suitable animal. This shows clearly that many farmers believe that the bull has a considerable influence on the milk-producing qualities of his offspring.

SHORTHORN BREEDERS' MILK RECORDS.

It must be admitted that at present only a very limited number of Irish breeders of Shorthorns keep records of the milk yield of their cows. This is to be regretted, as I am sure that there are numbers of cows in many of the pure breed herds which are of deep milking capacity, and which, as regards type and general merit, would be eligible for registration under the scheme for Improvement of Dairy Cattle if the owners would keep milk records. It is to be hoped that an increasing number of Shorthorn breeders will take advantage of this scheme, so that they may be in a position

to meet the demand of those farmers who want pure bred premium bulls with milking pedigrees.

Some people attribute the decrease in the quantity of the butter exported to the influence of the class of premium bull selected, and affirm that these sires produce bad milking heifers. It would be interesting and instructive to know the grounds on which those who make such an assertion base their opinion, as so far no facts have been adduced in proof of the accuracy of this contention. Have any farmers kept records of the milk of the cows that have been mated with a premium bull, and then kept records of the female progeny from these cows? This is really the only accurate way of obtaining reliable data from which to draw conclusions. I may here mention that at all the Department's Agricultural Stations records are being kept of the Dairy stock, and at the Ulster Dairy School an experiment is being carried out which it is hoped will in the course of time give an indication of what influence the sire has upon the milking properties of his offspring. Some men hold such strong opinions on this subject that they would confine all the premiums to bulls that have milking pedigrees, but they forget that connected with the breeding of cattle there are at least three important industries:—(1) dairying; (2) the trade in store cattle; and (3) the trade in fat or beef cattle. In 1909 the export of dairy products realised £4,027,812; store cattle, milch cows and heifers, £6,400,271; and fat or partially fat cattle, £4,351,279. The total export cattle trade in 1909 was, therefore, worth £10,751,550, or more than $2\frac{1}{2}$ times the value of the dairy products. All these industries are deserving of encouragement and assistance, and the Department, accordingly, would not be justified in supporting one to the disadvantage of others.

SCOTCH SHORTHORNS.

It has also been stated frequently that Scotch Shorthorns are beef producers, and are useless for milk, and that the Department have imported large numbers of bulls of this type to the detriment of the dairy industry. Now, there are three types of Shorthorns, the Booth, the Bates, and the Scotch, and there are both good and bad milking strains to be found in each of the three types. It entirely depends upon whether the owner or owners of these strains have in previous years paid attention to the production of milk.

At the Ulster Dairy School the Department have a dairy herd of 30 cows. These were nearly all purchased as yearling heifers in the Cookstown district. Most of them are the progeny of pure bred Shorthorn bulls of the Scotch type. Some of them, although not eligible for entry in the Shorthorn herd book, are practically

pure bred, as their sires, grandsires, and great-grandsires were pure bred Shorthorns. The average yield from this herd in 1910 was 650 gallons.

Since 1900 the Department have purchased in Scotland and in England 582 bulls, 316 being Shorthorns and 266 Aberdeen Angus and Galloways. The greater number of these were sold to applicants in the very poorest districts in the congested areas, where dairying is not pursued to any great extent, but where the raising of store cattle is the chief industry.

In many districts, however, where dairying is the largest industry, premium bulls of the Aberdeen Angus type are frequently placed by selected applicants with the approval of the County Committee of Agriculture; and these bulls are mated with the cows that provide the creamery with milk. Now, it is well known that Aberdeen Angus cattle are famous for producing beef, but have no reputation as milk producers. Therefore, in my opinion, premiums in dairying districts should be confined to Shorthorn bulls, preferably those from milking parents. This is all the more necessary where milk records are to be kept and where the heifer calves from the best milking cows are to be retained to renew the stock.

OBJECT OF DEPARTMENT'S SCHEME.

The object of the Department's general cattle scheme, which was started in 1900, is to improve the breed of cattle in Ireland. Is that object being accomplished by giving premiums to breeds other than Shorthorns? If it is, are the progeny of these bulls being retained in this country? I believe that the great majority of the progeny of premium bulls other than Shorthorns are sold either as stores or as beef cattle, but I think the Department and County Committees are quite justified in giving premiums to bulls of these breeds in many districts, because although they may not improve the breeding stock they certainly improve the stores and the beef cattle, and have assisted in giving Ireland a high reputation for her stock. We must not forget that the store stock trade and the beef trade with Great Britain are at present two of the most valuable and important agricultural industries of this country, and are, therefore, entitled to assistance from public funds.

The selection of the breed of premium bull for each district is, I am afraid, left too frequently to the applicant, who is likely to choose an animal of the breed which suits himself, without taking into account the requirements of the district. A few County Committees do restrict premiums to those breeds which they consider best suited to the counties, and some County Committees confine certain districts to a particular breed. This example might with advantage be followed by other County Committees.

SEASON AT WHICH COWS CALVE.

The time of year at which cows calve influences the yield of milk to a considerable extent. This has been shown by the admirable experiments on winter milk production carried out in County Cork, under the auspices of the Agricultural Committee and the Department, by Messrs. Adams and Prendergast. Two centres were selected and twenty cows in all were tested. Ten calved in November and ten in March and April. The November calvers gave an average yield of 802 gallons, and the spring calvers a yield of 680 gallons, a difference of 122 gallons per head in favour of those that calved in November. If we take the value of the milk at $4\frac{1}{2}d.$ per gallon, these cows left a return of £2 13s. 0d. each more than the others. This increase of milk from the November calved cows was undoubtedly due to the effect of the grass stimulating the flow of milk when the cows were turned out in May, and, as a result, these animals milked much longer than those that calved in spring.

I do not mean to suggest that all dairy cows should be managed so as to calve in October, November, or December, but if there were a much larger proportion of the total number of cows in Ireland calving in the autumn or early winter the yield of milk would be greater, and in my opinion it would be advantageous to the whole dairy industry of this country.

FEEDING OF COWS.

Lastly, the food given to cows is a determining factor in the quantity of milk they yield. This is a very wide subject, and one which, if it were dealt with properly, would require a paper to be devoted entirely to itself. I do not, therefore, propose to consider it in detail, but I may perhaps be permitted to draw attention to two points—(a) the effect of giving cows concentrated food during the period they are giving milk, and (b) the necessity of feeding cows well when they are dry and in calf.

Pastures may be divided into three classes:—

1. First class—where the extra cost of concentrated food given to the cows in summer would probably not be recovered in the increased yield of milk.

2. Second class—where cows getting small quantities of concentrated food would by their increased flow of milk pay well for the extra outlay.

3. Poor—where the cows will not give anything like their full flow of milk unless they are liberally hand-fed. The greater part of the area under pasture in Ireland comes under classes 2 and 3.

In some districts in Ireland cows which are in calf and which

are yielding no milk during the winter are given a feed of hay morning and evening, while during the daytime they are turned out on bare pasture quite regardless of weather. In the autumn these cows are full of bloom, but when they come to calve in spring they are thin, starved, and almost emaciated. Animals which calve in such a condition cannot possibly give their maximum yield of milk that season. The food consumed by these cows must first nourish the body before milk can be formed, and emaciated animals will require much more food to nourish the system than animals in good condition. Besides, it should not be forgotten that pregnant cows are feeding an embryo calf, which is a constant drain on the dam.

SOME RECOMMENDATIONS.

I would recommend that, in order to increase the production of milk in Ireland without interfering with other agricultural industries, farmers should—

- (1) Breed only from cows which give the highest yield of milk ;
- (2) Retain their heifer calves to renew the stock ;
- (3) Mate these cows and heifers with bulls whose female parents have a high reputation as being good milkers ;
- (4) Have more cows calving in autumn ; and
- (5) Feed the cows liberally both when dry and when giving milk.

THE IRISH CROWN BRAND FOR PICKLED HERRINGS.

Among preserved articles of human food, few, if any, have a longer or more creditable history than herrings cured in salt. Already a flourishing industry in the eleventh century, the cured herring trade of the British Isles at the present day represents an important investment of capital, and gives seasonal employment to many thousands of persons, while its products are distributed to the western hemisphere and across the continent of Europe to the remoter parts of Russia and Turkestan.

The application of a Crown Brand, that is to say, an official mark of standardisation, to barrels of herrings cured for export, has been carried on in Scotland for just a century. By the rules under which it is now administered, six grades of herring are distinguished, dependent on size and degree of maturity, and these are universally accepted by the herring trade. The high position of the Scottish Crown Brand is due to the care which the Fishery Board for Scotland have constantly taken to enhance its credit, and to the realisation by curers of the fact that its value depends largely on their own endeavours to maintain a high average quality in each grade.

Now, as formerly, some firms do not submit their fish for the brand, trusting rather to the reputation in the markets of their own name or trade mark, or for other reasons. However, in the expansion of trade consequent upon increased facilities of railway and steamer transit, the necessity is increasingly felt for a guarantee of standardisation such as that afforded by an official brand.

In 1819 a Government brand for cured fish was established in Ireland in connection with a scheme of bounties. Its purpose was to indicate the packages of fish upon which the bounty had been paid, a minimum quality of cure and packing being required. This brand, however, disappeared in 1880 along with the bounty system and its administrative machinery.

With the revival, during the last three years, of the herring fishing on the east coast of Ireland, the curers working there have felt themselves at a disadvantage owing to the preference of continental merchants for fish officially branded. This need of the Irish fish-curing trade was brought to the notice of the Department, and, as a result of conferences between representatives of the latter and of the trade, arrangements were made to institute an Irish Crown Brand for cured herrings in barrels, to be applied by way

of trial, during the season of 1911, at certain centres on the east coast of Ireland to barrels of herrings which may be submitted to the Department's officers for branding and which conform to the regulations.

This official standardisation mark will include the six classes or grades of herring already well recognised. The regulations will be the same as those in force in Scotland, so far as they are applicable in Ireland.

A description of the Irish Crown Brand, with the grades recognised thereunder, is appended. The regulations may be briefly summarised as follows :—

The staves and ends of barrels must reach a certain standard of quality of material, workmanship and dimensions. The number and position of hoops, whether of wood or iron, is specified. The standard capacity of a barrel is $26\frac{2}{3}$ imperial gallons, and of a half barrel $13\frac{1}{3}$.

The curer's name and the name of the port or place of cure, the grade of the contained fish, date of cure and packer's number must be marked on the barrels in a specified manner and position previously to their being submitted for inspection.

The fish must be of satisfactory quality ; they must have been properly handled in packing, and "pined" in salt for from eight to ten free days, according to grade.

Herrings which have for any reason been removed from their original barrels and re-packed will be branded only on certain conditions, and with a distinctive mark.

The barrels of fish submitted for branding must be conveniently arranged for inspection in the curer's yard ; and brand fees of 4*d.* per barrel and 2*d.* per half-barrel are payable in advance to the Department.

The duty of applying the Brand is obviously one involving great responsibility, and can only be entrusted to officers possessing special knowledge and experience of the work.

The Brand is a guarantee only that the herrings have been examined in accordance with the regulations, and found up to the standard at the time. The Department's officers cannot control the movements or usage of any parcel of herrings after the branding has been completed. The effects of under-salting or exposure of the branded barrels of fish to sun heat or other ill-treatment may not become noticeable until the goods are in the hands of the purchaser. The future reputation of the Irish Crown Brand rests, therefore, largely in the hands of the curers. The higher the quality in each grade, and the better the condition of the fish is found to be by the purchaser, the greater the credit of the brand, and, consequently, its money value to the curers, will become.

**THE IRISH CROWN BRAND FOR PICKLED
HERRINGS.**

I.—STENCIL MARK.



The above is a reduced copy of the official stencil mark which must be placed on the head end of every barrel of herrings which receives the Irish Crown Brand.

The words "La. Full," "Full," "Mat. Full," "Mattie," "La. Spent," or "Spent" are to be inserted according to the quality of the herrings.

The initials of the Department's branding officer and the numerals indicating the year of packing are variable.

II.—MARKS TO BE BRANDED ON THE SIDES OF BARRELS.

The initials of the Department's branding officer and the numerals indicating the year of packing are variable.



"LARGE FULL."

For herrings with roe or milt, not less than $11\frac{1}{2}$ inches in extreme length.



"FULL."

For herrings with roe or milt, not less than $10\frac{1}{2}$ inches in extreme length.



"MAT. FULL."

For herrings with roe or milt clearly seen at the neck or throat, not less than $9\frac{1}{2}$ inches in extreme length.



"MATTIE."

For "Mattie" herrings of not less than 9 inches in extreme length.



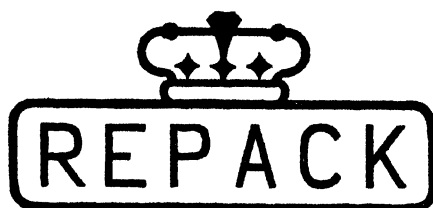
"LARGE SPENT."

For "Spent" herrings not less than $10\frac{1}{2}$ inches in extreme length.



"SPENT."

For "Spent" herrings less than $10\frac{1}{2}$ inches but not less than 9 inches in extreme length.



"REPACK" BRAND.

No herrings which have lost the original pickle shall be accorded the Irish Crown Brand unless they have been re-packed, washed in pickle, and presented separately for inspection, when, if found worthy in every other respect, they shall, in addition to the Crown Brand, receive the "repack" iron across the crown above the harp, so that it cannot be removed without defacing the crown brand. If barrels or half-barrels of re-packed herrings, instead of being offered separately, are found mixed up with any parcel of bung-packed herrings presented for the brand, the whole parcel shall be rejected.

Where the brand applied for has been refused on the grounds of bad selection, or the presence of too many under-sized herrings, the fish may be re-selected and presented anew, but they must be pickled with original pickle, when they may be branded, if found otherwise satisfactory, with the "repack" iron added.

The daunt must be used for all re-packed herrings.

N.B.—The Irish Crown Brand will be affixed only when the barrels and their contents conform strictly to the regulations.

T. P. GILL,

Secretary.

Information relating to the Irish Crown Brand will be supplied on application in person or by letter, which need not be stamped, to the Secretary, Department of Agriculture and Technical Instruction, Fisheries Branch, 3 Kildare Place, Dublin.

THE IRISH TABLE DUCK INDUSTRY.

The number of ducks in Ireland in 1910 is given in the official returns as 3,367,578, showing an increase since 1904 of 468,793, or 16 per cent. This increase is composed largely of ducks of the Indian Runner type, which though excellent for laying purposes are too small to be first-class table birds. Ducks are kept, however, almost entirely for egg production over the greater part of Ireland, with the exception of some districts in the East and North, and the development of this branch of the industry has brought very considerable benefits to Irish producers. On the other hand this development has led to large quantities of surplus birds—which are frequently only a bye-product in the maintenance of flocks of layers—being put upon local markets irrespective of demand or price; and, as attempts are seldom made to fatten these birds before selling them, the prices realised are naturally not high. Such birds are usually cast off stock birds of indefinite age or tough nondescripts past their first youth, with muscles prematurely hardened by a ceaseless hunt for food. The writer well remembers once buying some birds of this description, apparently five or six months old, at 1s. each. Closer acquaintance, however, proved unsatisfactory and further purchases of that kind were carefully avoided. Large numbers of such birds are sold annually in some districts from 10d. to 1s. 3d. each, and the supply appears to be increasing in several markets, though it is highly improbable that any profit can accrue to the producer at such prices. Unfortunately, too, buyers in some districts will only give the same low price whether the duck is good or bad—apparently because a trade in ducks of inferior quality has been developed. Consequently no continued efforts are made to produce a better-class bird, or to build up a more profitable trade. Such a condition of things can scarcely be considered economic, either as regards individual profit or national prosperity.

There are districts, however, such as Dundalk, Drogheda, Ardee, Carrickmacross, Kingscourt, Lurgan, Portadown, Limavady and Londonderry where more attention is paid to the production of better-class table ducklings, and in several of these districts all the broody hens obtainable early in the season are used for hatching duck eggs. The industry is almost entirely confined to small farmers and cottagers and a fairly typical home of a duck-rearer in

Co. Louth is shown in fig. 1. This year, the birds reared and sold, and the prices obtained for them by this rearer were as follows :—

				<i>s.</i>	<i>d.</i>
April	1,	30 ducklings	at	2	6 each.
„	21,	16 „	at	2	3 „
May	4,	15 „	at	2	3 „
„	10,	12 „	at	2	0 „
June	10,	20 „	at	1	8 „

All the birds were sold to a local “higgler,” but the rearer states that in previous years 3*s.* and 3*s.* 6*d.* each was obtained for the earliest birds.

The large shippers in these districts complain, however, that the continued use of late years of Indian Runner ducks without sufficient admixture of Aylesbury blood, has caused considerable deterioration in the general quality of the ducklings marketed. One shipper who sends from 20,000 to 30,000 ducklings annually to the Liverpool district, states that he has been asked by his customers to sell the “white” ducklings separately, but that he could not comply with this request as he would find it difficult to dispose of the inferior (coloured) birds alone. Practically all the large shippers state that they cannot get nearly enough ducklings of suitable quality early in the season; that the demand for really good ducklings is always keen, and the supply always short; and that too many birds of inferior quality are brought to market. Several shippers state that they export upwards of 30,000 ducks annually, and the following figures will give some idea of the trade in ducklings in a few markets this year :—

Approximate average number of Ducklings in each Market per week and price realised.

First half of April	<div> Dundalk 10 dozens Drogheda 10 „ Ardee 3 to 4 „ </div>	<div> <i>Prices.</i> 2<i>s.</i> to 3<i>s.</i> each. </div>
Latter half of April	<div> Dundalk 100 dozens Drogheda 50 „ Ardee 40 „ </div>	<div> 1<i>s.</i> 8<i>d.</i> to 2<i>s.</i> 6<i>d.</i> each. </div>
Latter half of May and the month of June	<div> Dundalk 140 dozens Drogheda 60 „ Ardee 50 „ </div>	<div> 1<i>s.</i> 6<i>d.</i> to 2<i>s.</i> 6<i>d.</i> each. </div>

In March few ducklings are marketed, supplies consisting almost entirely of “winter ducks,” i.e., birds hatched late the previous autumn. Prices similar to the above were obtained in the other duckling districts this season.

IRISH TABLE DUCK INDUSTRY.



Fig. 1.—The home of a duck-rearer in Co. Louth.

When these prices are compared with those quoted in the London markets for prime Aylesbury ducklings, a considerable difference is observed. In March and April this year, Aylesbury ducklings were quoted in London from 3s. 6d. to 7s. 6d. each. In May from 3s. 6d. to 6s. each. The difference between these prices and those paid to Irish producers is apparently due, partly to the fine quality and high reputation of Aylesbury ducks, and partly to the close proximity of the Aylesbury district to a high-class consuming centre such as London. Neither of these causes, however, offer insuperable obstacles to competition in the same market by Irish producers. The journey from the east coast of Ireland to London occupies only about twelve hours; and as far as quality is concerned, the writer is of opinion, that ducklings can be produced in Ireland, *in large quantities*, at least equal to the best produced elsewhere. Some of the table ducklings exhibited at the Royal Dublin Society's Show last winter tend to confirm this opinion. At the same time there is little doubt that the bulk of Irish duck rearers have much to learn before they can produce ducklings in quantity equal to the finest product of the Aylesbury district.

For many years past there has been a large demand in London for ducklings produced in the Aylesbury district of Bucks, and in some parts of Bedfordshire.

The Aylesbury Industry It has been estimated that ducklings to the value of £30,000 annually have been sent to London from these districts for many years, practically all the birds being produced by small farmers and cottagers. The Aylesbury industry is an old established one. In a report presented to the Royal Commission on Agriculture in 1895, Mr. Aubrey Spencer, Assistant Commissioner, says :—

“The number of ducklings reared and sold annually by individuals varies from a few hundred to several thousand. . . . At Weston Turville I was told that about eleven men in that village fattened 1,000 ducks apiece annually, and that about 16,000 or 17,000 were sent from there to London in a year. As a rule the duck fatteners do not themselves keep stock ducks, but buy eggs from farmers or others who keep breeding ducks, so that the breeding and rearing are in different hands.

“It is a main object of the duck fattener to bring out as many young ducks as he can ready for the market in February or early in March, when the game season is over, and the highest prices are obtainable for ducklings. The season for ducklings commences in February and continues till about the end of August, the prices falling as the season advances. In February or March as much as £1 1s. a couple is occasionally obtained for ducklings, and one fattener at Weston Turville informed me that in 1894 he had obtained

the very exceptional price of 24s. for a couple, which was the highest figure he had ever reached. The average in March is more usually about 12s. or 14s. the couple. The carriage and salesmen's commission (5 per cent.) for the ducklings are reckoned at about 3d. a bird, and duck fatteners commonly estimated that after deducting carriage and commission they would receive on the average throughout the season about 3s. to 3s. 3d. a duck. I am, however, inclined to think that this estimate is rather under than over the mark, for in August when I visited the district prices were still as high as 6s. to 7s. a couple."

In addition to this high class trade, however, a general demand for well fed, but somewhat cheaper ducklings, **General demand** has grown up of recent years in Great Britain, especially in manufacturing districts, and considerable numbers of such ducks are also marketed in London.

More than one "duck farm" has been started in England to meet this demand, but few of these ventures have been **"Duck Farms"** really successful. One "duck farm" however in the North of England, is said to have been working for eighteen years, and to produce something like 30,000 ducklings annually from purchased eggs, many of these eggs being imported from Ireland. America too, claims many successful duck plants of huge size. There is little reason to doubt however, that in Ireland, duck rearing for table purposes holds out better prospects to the small holder than to the specialist duck farmer on a large scale.

The industry seems particularly suited to poultry-keepers in Ireland. The market is comparatively close at hand; the climate is very suitable; oats, potatoes, and milk—excellent foods when properly used, **Duck-rearing and Irish conditions** for fattening ducklings—are home products; tallow greaves are produced in Ireland, and can be purchased at a moderate price, whilst other flesh foods can be obtained without much difficulty. Ducklings too, are hardy and subject to few diseases; they are easier to rear than chickens or turkeys, and require much less space; whilst as they should be marketed when from eight to ten weeks old, the cash returns are quick. The rearing of table ducklings need not interfere to any extent with the present production of duck eggs unless desired. The two branches of duck keeping can go on side by side, egg production being supplemented by table duck rearing. It is not necessary in every case to keep a breeding flock of pure bred table ducks, as quite good ducklings can be produced from Indian Runner ducks provided they are properly mated with drakes of a table

IRISH TABLE DUCK INDUSTRY.



Fig. 2.—Dundalk Duck Market, June 19th, 1911.

SH TABLE DUCK INDUSTRY



Fig. 3.—Ducks about to be shipped. A single shipper's purchases in Dundalk Market, June 19th, 1911.

breed, but of course if it is desired to rear table ducklings of the finest quality only the proper table breeds should be used. Much will depend, however, upon the methods adopted and persons who may be contemplating the fattening of large quantities of ducklings are advised to put themselves in touch with likely buyers before commencing operations, and to gain definite information regarding the markets they intend to supply. A careful study should also be made of the best methods of rearing and fattening. Generally speaking the principal aim should be to produce, *especially early in the year*, well fattened ducklings of good quality, weighing from 4 lbs. to 5½ lbs. each when from eight to ten weeks old.

With a view to improving the quality of table ducklings produced in Ireland, the Department, in conjunction with the Co. Armagh Committee of Agriculture, established last year as an experiment, two Aylesbury duck centres near Lurgan and Portadown. At each of these centres the station-keeper purchased thirty selected Aylesbury ducks and the necessary number of drakes, and erected suitable houses for the accommodation of the birds. In order to earn a premium of £5, each station-keeper was asked to sell sixty dozens of eggs for hatching purposes at 2s. per dozen between January 1st and May 31st to residents in Co. Armagh. The stations sold 73 and 75 dozens respectively as specified, besides selling other sittings outside the county. The demand for eggs in the early season was keen—often exceeding the supply—and the percentage of fertile eggs was generally high. Some ducklings reared from these eggs were sold to local shippers in May and June at 2s. 6d. to 2s. 10d. per bird, and weighed over 5 lbs. each at nine weeks old, whilst other ducklings are being kept for stock purposes, and it is hoped will be used for producing table ducklings, either pure or crossbred, next year.

In addition to these special stations a limited number of ducks of table breeds have been kept at some of the Department's ordinary egg distributing stations since the commencement of the Department's Poultry Scheme. At present, eggs from Aylesbury, Pekin, or Rouen ducks are distributed from thirty-three stations situated in the following counties:—Armagh, Cavan, Donegal, Down, Kildare, King's Co., Londonderry, Meath, Tipperary, Waterford, Westmeath, Wexford and Wicklow.

The three well known breeds of table ducks are the *Aylesbury*, the *Pekin* and the *Rouen*. Of these the first place must undoubtedly be given to the *Aylesbury*. It has pure white plumage, is hardy, grows rapidly, and carries a large quantity of excellent light coloured flesh. It is a

fairly good layer, averaging from 80 to 100 eggs per annum. Adult drakes weigh about 10 lbs., ducks about 9 lbs.; but birds weighing a pound or two less, provided they are well developed and vigorous, usually give the best results as stock birds.

The *Pekin* is sometimes considered to be a better layer than the Aylesbury, though—as bred in Great Britain at the present time—it does not produce such easily fattened, fine fleshed ducklings as the Aylesbury. Adult drakes weigh about 8 lbs., ducks about 7 lbs. This breed has creamy white plumage.

The *Rouen* is a hardy breed with fine flesh, quite as large as the Aylesbury, but with coloured plumage. They are usually poorer layers however, and mature more slowly. Adult drakes weigh about 10 lbs., ducks about 9 lbs.

Where it is not desired to keep a breeding flock of Aylesbury ducks, and where their eggs cannot be easily obtained, quite good ducklings can be produced by crossing Aylesbury drakes with the Indian Runner ducks kept for egg production. This cross is particularly useful early in the season, as the Indian Runner duck usually lays much better in the winter and early spring months than the pure bred Aylesbury. The crossbred duckling is of good size, is generally a good layer, and may if desired, be profitably kept for egg production. If this first cross bird is mated again to a pure bred Aylesbury drake, very good table ducklings can be produced, many of which will be white in colour.

In mating birds in this way it is advisable to select from six to eight early hatched Runner ducks of large size, and mate them to two young, early hatched Aylesbury drakes of moderate size—about 7 lbs. each. The birds should be mated in October for early egg production. Pekin or Rouen drakes may also be used, but the Aylesbury cross is most recommended. For later production the Pekin or Rouen may be crossed with the Aylesbury if desired. The Aylesbury-Pekin is a well known cross, and has the advantage as compared to Rouen and Indian Runner crosses of producing no coloured ducklings.

Stock Ducks.

The birds intended for stock purposes should be hatched in

Selection and Management of Stock Ducks

March or April—as later hatched birds will seldom lay sufficiently early in spring—and from the first allowed free range and given no forcing or fattening foods. October or November is the best time to mate the stock, and from three to five ducks may be allowed to one drake. It is important to provide the breeding stock with a practically unlimited run and free access to plenty of swimming water. The housing

IRISH TABLE DUCK INDUSTRY.

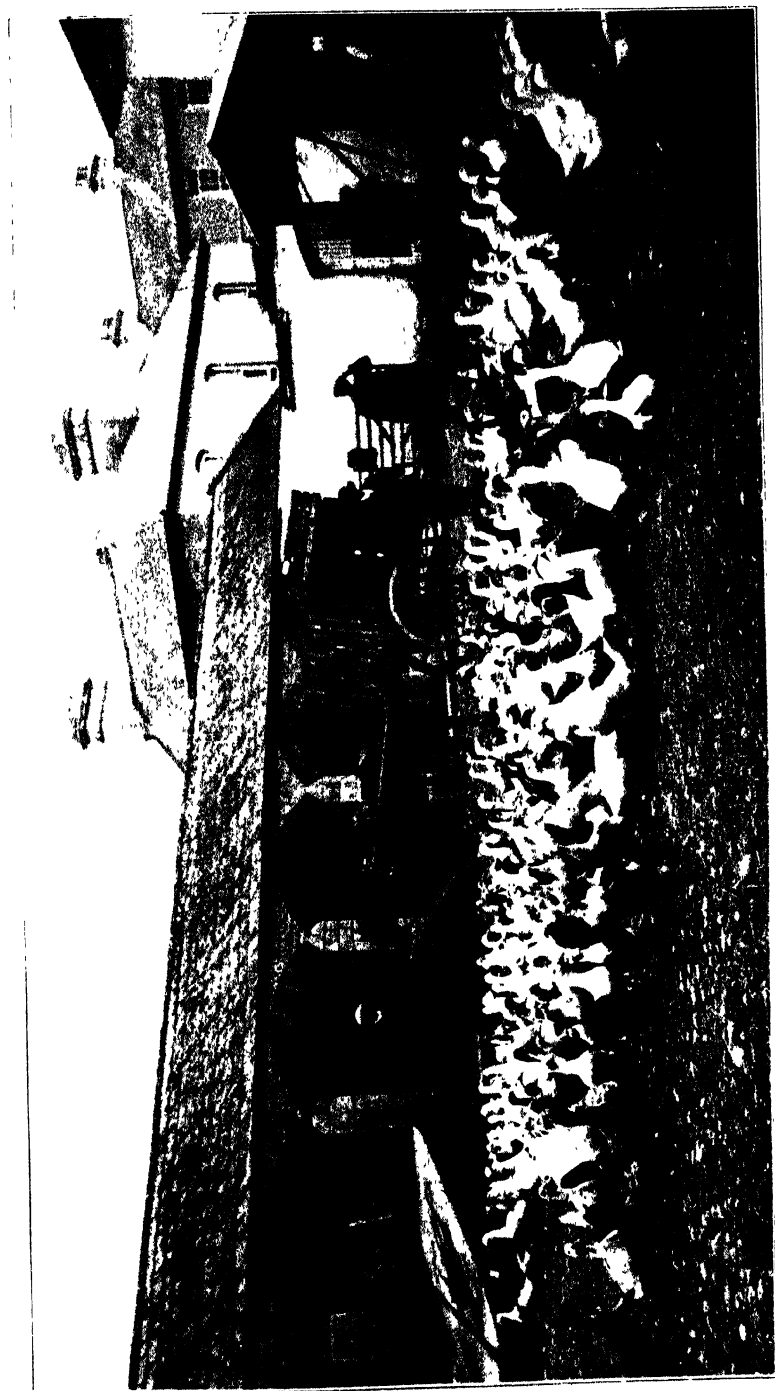


Fig. 4.—A shipper's purchases about to leave Ardee Market, June 20th, 1911.

IRISH TABLE DUCK INDUSTRY.



Fig. 5.—One of the experimental duck stations in the
Co. Armagh.

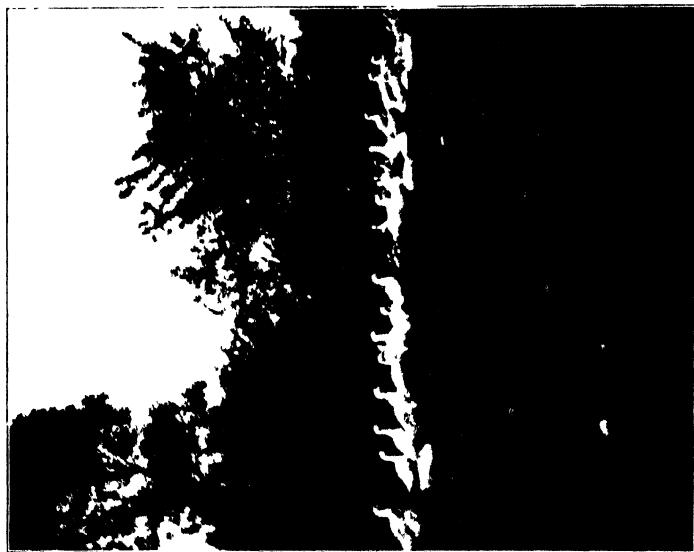


Fig. 6.—A flock of ducklings hatched from the stock at one
of the experimental duck stations.

may be of a simple nature, but must be dry, capacious and airy. The practice of closing up the stock at night in small badly ventilated houses cannot be too strongly condemned. An open shed, which may be part of some farm building, will provide good housing accommodation. Each bird will require at least three square feet of floor space, and double this may be allowed with advantage. The floor must be dry and kept well bedded with clean material such as straw, turf-mould, etc. Nest boxes are unnecessary.

In order to obtain a satisfactory number of fertile eggs the stock ducks must be given greenstuffs and animal food regularly, except during the summer months when the birds, if given constant access to a suitable run, will procure these essential foods for themselves. Turnips, cabbage, and early cut clover hay are excellent green stuffs for ducks. The clover hay requires to be cut into short chaff and steeped for about twelve hours in hot water before use; the turnips should be cooked and mashed; whilst the cabbage may be either cooked or chopped up finely and fed raw. A form of animal food, which as a rule is easily obtainable is the refuse—especially blood—from butchers' shops and slaughter houses. It happens sometimes too, that an animal is slaughtered on the farm, and—provided of course there is no infectious disease in the carcase—the blood and offal should be saved for the ducks. All such material must be thoroughly cooked and minced before use and fed as fresh as possible. Tallow greaves are also obtainable in Ireland at a moderate price. The ducks' rations should consist almost entirely of soft, mixed foods, though an occasional feed of grain may be given. The mixture used should vary according to the time of year, and below is given a list of suitable rations for the different periods. Any changes in diet should be made gradually, and the effect on the birds noted. This specially applies to animal food which, if given suddenly in large quantities, is liable to cause severe diarrhoea. The ducks may be fed twice each day, morning and evening; but it is important to give only as much food at each meal as the birds readily clear up. The morning meal should be scanty, so as to induce the ducks to take exercise in seeking food for themselves since fat ducks are lazy, lay badly, and their eggs are usually infertile. It is advisable to feed in long troughs covered with movable wooden cages in order to prevent trampling on the food, and it is most important to keep such feeding vessels sweet and clean.

The ducks require access at all times to grit and lime. A load of screenings from a stone crushing machine, or of gravel from a river bed or gravel pit, will provide sufficient grit for a long period. The bulk of this material should be about the size of split peas or small

Indian corn, but the presence of some finer stuff like sand is advantageous. Crushed oyster shells provide lime in a good form, and can be purchased in most country towns.

RATION I.

For November 1st to January 1st.

Suitable	5 parts	*" Oat Smash."
Rations	5 „	Fine Sharps or Pollard.
	2 „	Bran.
	3 „	Indian Meal.
	1 „	Cooked Animal Food.

RATION II.

For January 1st to April 1st.

5 parts	*" Oat Smash."
5 „	Fine Sharps or Pollard.
5 „	Indian Meal.
2 „	Cooked Animal Food.

RATION III.

For April 1st to June 1st.

5 parts	*" Oat Smash."
5 „	Fine Sharps or Pollard.
3 „	Bran.
2 „	Indian Meal.
1 „	Cooked Animal Food.

RATION IV.

For June 1st to November 1st.

5 parts	*" Oat Smash."
5 „	Fine Sharps or Pollard.
5 „	Bran.

The parts given are by *weight* and not by volume. If, however, the quantities are carefully weighed a few times sufficient accuracy in judging the proper amounts will probably be gained and constant weighing prove unnecessary. The dry portions of the ration should be mixed first, and if desired a fairly large quantity can be stored in one receptacle ready for use. The greenstuff and animal food should be added to the dry mixture, together with sufficient liquid to form, after thorough stirring, a crumbly, but not sloppy mass.

* "Oat Smash" refers to oats coarsely ground in ordinary country mills.

It is better to prepare at one time only sufficient for one day's use. The greenstuffs may be varied as frequently as possible, and, if desired, cooked potatoes may occasionally be added. Only good sound meals should ever be used, and the "oat smash" should be ground as finely as possible.

TABLE DUCKLINGS.

Duck eggs may be hatched either with hens or incubators, ducks being seldom used for this purpose. For in-

Hatching formation regarding the management of sitting hens reference should be made to the Department's Leaflets Nos. 30 and 43. Duck eggs should always be set on the ground, care being taken to protect them from frost. About ten or twelve eggs will be found sufficient for one hen, especially early in the year. It is very important to keep the ground beneath the nest moist during hatching, and after the first day or two a little warm water at about blood heat should be sprinkled daily over the eggs; but towards the end of the hatch they may be dipped in the water for a minute or so. If this moistening is neglected many of the birds will probably fail to come out.

A reliable incubator will be found exceedingly useful for hatching early ducklings. A good machine to hold fifty

Incubators eggs can be purchased for from £3 to £5 10s., and if fertile eggs are used and ordinary care given to the working of the incubator, good results will be obtained. A hatching temperature of 102° to 103° F. is usually adopted, and the moistening of the eggs must be regularly attended to. Turning and changing the position of the eggs in the drawer twice daily is important, and the drawer should be allowed to remain out for a short period daily in order that the eggs may be aired and cooled. This period should vary according to the weather and the hatching stage, from 5 to 10 minutes at the start, to 15 to 20 minutes (or even longer in hot weather) towards the end. Detailed instructions for working incubators are usually issued by the makers and vary somewhat according to the make of machine.

Ducklings must be reared in a rather different manner to chickens. They require less continued heat

Rearing during early life, and are sometimes reared in hot weather without brooding at all. However, it is usually advisable to brood them for ten days or so either under a hen or in a foster mother, and this period must be prolonged in cold weather. It is here that the breeder's judgment is particularly needed as the weather conditions must be carefully watched and action taken accordingly. Generally speaking the sooner the

ducklings can be given access to a limited grass run the better, but long grass and muddy runs are dangerous. If hens are used for rearing purposes it is advisable to confine them in coops placed during cold weather in a large shed where the ducklings can take exercise. If brooders are used they must be given a similar shelter.

Ducklings require no food until 24 to 36 hours old. If hatched under hens they may be left in the nest for this time; if hatched in incubators they may be taken from the machine when dry, and kept in flannel lined baskets before the fire ere being fed and transferred to the brooders. As the ducklings are intended to be ready for the table at eight to ten weeks of age it is obvious that the feeding and general treatment must be on suitable lines: that is, the foods used must be both forcing and fattening and the birds' liberty—especially towards the later stages—restricted. At the start however the diet must be simple and a considerable amount of exercise permitted. The ducklings may be kept in flocks of 20 to 50 in fairly large grass runs—if possible with trees for shade and shelter—fenced in with wire netting about 1 foot 6 inches high. These runs should be frequently changed and the grass mown or grazed. When the birds are five or six weeks old their exercise must be strictly limited, otherwise they will not fatten properly. Swimming water is not necessary—merely fresh drinking water in moderation. After the brooding period is over very simple housing will suffice; large packing cases with a piece of felt over the top to turn the rain are often used.

Animal food is most essential for the ducklings almost from the start. In England tallow greaves—the refuse from candle factories and tallow refineries—are almost invariably used. Similar greaves are produced in Ireland and sold at a moderate price, whilst the rearer can also use the same kind of animal food advised for the breeding stock.

Green food must not be forgotten, though after the first few days the ducklings if given a fresh grass run will gather a considerable amount for themselves and greenstuff in bulk need not be supplied in the food. However boiled turnips, boiled nettles, chopped cabbage, etc., may occasionally be given and will assist in keeping the ducklings in health, though it is better to feed no green foods during the last week of fattening. The birds must have free access to grit, and coarse sand should be kept in the drinking vessels, and a little occasionally sprinkled over the food of the younger birds.

A considerable variety of foodstuffs are used for fattening. In the Aylesbury district these consist of **Variety of Food used** meal, rice, brewers' grains, bran, pollard, and tallow greaves, or meat of some sort. At first the ducklings are fed upon boiled rice, pollard and bran, with a very small allowance of meat, or perhaps only the liquid in which the greaves have been boiled. As the ducklings get larger a portion of rice is generally replaced by brewers' grains. During the last three or four weeks the feeding in most cases consists solely of barley-meal, greaves and brewers' grains, or as a substitute for the latter, pollard or bran. Rice is sometimes included in the diet until the fattening process is completed. In other cases only barley meal and greaves are given during the final stages. The rice and greaves are always well boiled before being fed, and the liquid in which the greaves have been boiled is used for mixing with the meals. Different methods prevail, however, among the most successful fatteners.

In Ireland oatmeal, Sussex ground oats, "oat smash," bran, pollard, sharps, potatoes and milk should be included in the dietary. Indian meal is better left out altogether as it tends to produce yellow fat and flesh which are objectionable. Properly prepared ground oats after the Sussex style, can now be obtained from several Irish millers, and should whenever possible, form one of the staple foods. Failing this, "oat smash," ground as finely as possible, may be given after the first ten days or so: earlier than this fine oatmeal, or ground oats is preferable.

The following dietary is given merely as an example of a suitable system of feeding the ducklings, and it must not be inferred that rigid adherence to these rations is necessary for success.

RATION I.

First Week.

- 1 part Ground Oats or fine Oatmeal.
- 1 „ Fine Sharps.
- 1 „ Bran.

Mix with milk and feed four times per day.

RATION II.

Second Week.

- 5 parts Ground Oats or fine Oatmeal.
- 5 „ Fine Sharps.
- 5 „ Bran.
- 1 „ Animal Food.

Mix with milk or water and feed four times per day.

RATION III.

Third Week.

- 5 parts Ground Oats or "Oat Smash."
- 5 „ Pollard or Sharps.
- 5 „ Bran.
- 1 „ Animal Food.

Mix with cooked potatoes and feed four times per day.

RATION IV.

Fourth Week and until Killing.

- 5 parts "Oat Smash."
- 5 „ Pollard or Sharps.
- 5 „ Bran.
- 2 „ Animal Food.

Mix with cooked potatoes and feed four times per day until the fifth week ; afterwards thrice daily.

All foods must be mixed into a crumbly—not sloppy—condition, and given fresh. Milk may be used whenever available, and after the second week, in any form.

The ducklings should always be marketed before they commence to get their adult plumage, which usually happens when the birds are about eleven weeks old. The ducks frequently cease to gain weight at this time and usually deteriorate in quality, besides being difficult to pluck if killed whilst the new feathers are growing.

PERCY A. FRANCIS.

ORGANISATION OF AGRICULTURAL WOMEN IN BELGIUM.

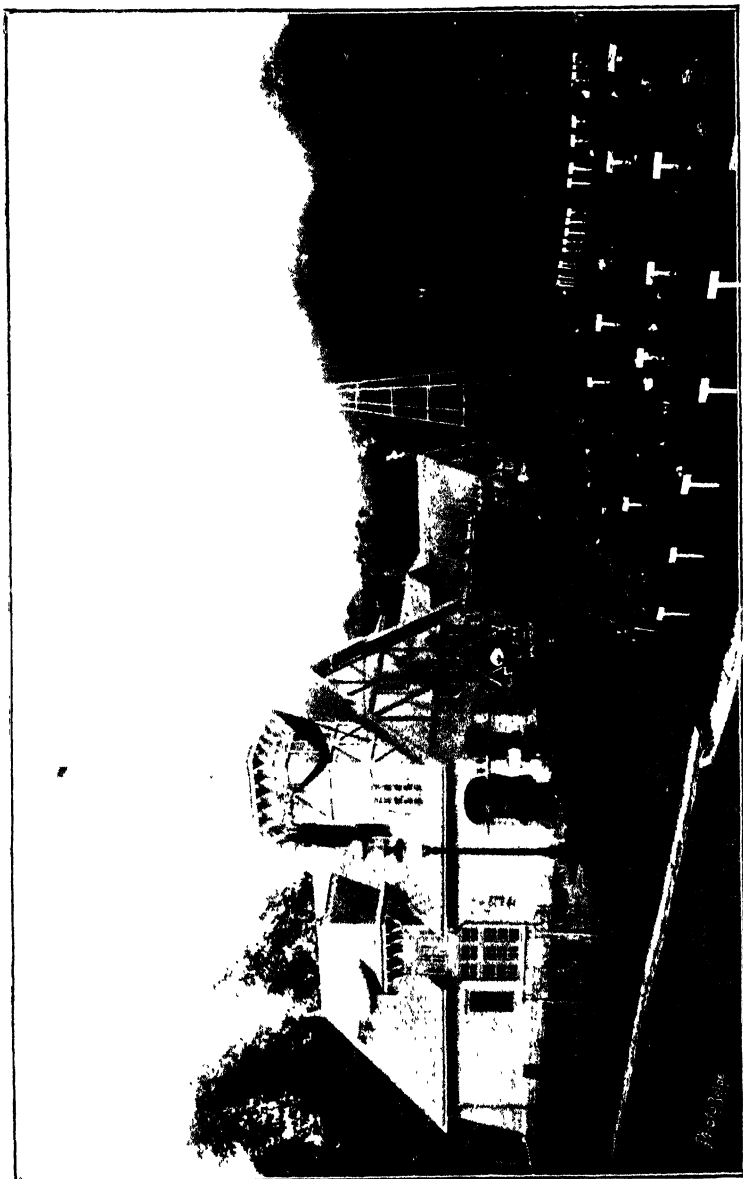


Fig. 1. Exterior of the *Pavillon de la Fermière*, Brussels Exhibition.

ORGANISATION OF AGRICULTURAL WOMEN IN BELGIUM.

One of the most interesting and suggestive features of the recent International Exhibition at Brussels was a small pavilion, not far from the Palace of Agriculture, and known as "*Le Pavillon de la Fermière*." The object of this modest, but tasteful and effective building, was to display, as far as possible, everything pertaining to the calling of the Belgian *fermière* or farm-wife, if one may so render a word which has no really satisfactory English equivalent, unless we accept dictionary authority and boldly venture on "farmeress."

Part of the pavilion was arranged as a model farmhouse, with kitchen, living-room and bedroom, whilst outside the house were stable, cow-houses, dairy and poultry-run, all constructed on the most approved modern principles. In every part of the building exhibits were shown which were all in some way connected with the everyday life of the countrywoman, her work in garden and stables, her clothes, her cookery, and the care of her house and children. A separate section was devoted to educational matters, and here practical lessons and demonstrations were given daily by instructresses from the various rural domestic economy schools.*

The prominence given to the *fermière* at the Brussels Exhibition is indicative of a growing sense of the economic importance of women's work on the farm, which has of late been steadily making headway, with the result that active, if somewhat belated, efforts are being made to equip the farmer's wife and daughters for the multifarious and often highly technical duties which normally fall to their charge. The farmeress must indeed be "able to put her hand to anything," and the policy of letting her muddle along somehow, by the light of nature or of vague traditional lore, has everywhere proved to be as unsatisfactory as it was irrational. Rural economists have come to see that inefficiency in one half of the family coach means inefficiency as a whole, and, in Belgium

* The inception of the Pavilion was due to the initiative of Mr. P. De Vuyst, Chief Inspector to the Ministry of Agriculture and Public Works of Belgium. Mr. De Vuyst is keenly interested in the progress and education of the *fermière*, and to his courtesy is due much of the material contained in the present article. Mr. De Vuyst is the author of an extremely interesting book, entitled *Le rôle social de la fermière*, published by Albert Dewit, 53 Rue Royale, Brussels. The book, which has just entered upon its second edition, contains a mass of information on the subject of the agricultural training of women and girls, and its gradual development in all parts of the world. The question of agricultural associations for women is dealt with at some length, and many valuable suggestions are given as to the organisation of societies, lectures and courses of study, village libraries and similar matters of special interest to the agricultural woman.

at least, they have determined that their *fermières* shall in future be given better opportunities of obtaining the professional knowledge necessary to their calling.

Considered from a merely numerical standpoint, the agricultural woman is an important factor in Belgian social economy. The latest statistics show that, while the numbers of women engaged in commerce and industry are, respectively, 385,000 and 325,000, the number employed in agricultural work is no less than 514,000. Moreover, two important branches of agricultural activity are practically in the hands of the *fermière*, dairying and poultry rearing. Now the annual milk yield of Belgium represents 360,000,000 francs (£14,400,000), a sum which about equals her total annual railway receipts or the average output of her coal mines. Again, the yearly revenue from her poultry yards would more than meet her War Office estimates, whilst, as sources of profit to the Belgian farmer, table poultry and heavy draught horses are of about equal importance.*

It is clear, therefore, that no small proportion of the national wealth of Belgium is earned by the *fermière*; consequently, to put the matter upon the lowest utilitarian basis, it will *pay* the nation to raise her standard of efficiency. There is an old Irish proverb which says, "Woman makes the home, the home makes the man," and in Belgium, too, they look to their *fermières* for more than the mere heaping together of centimes and francs. Here again we cannot do better than quote Mr. De Vuyst, who says: "The social and moral mission of the *fermière* is greater even than that of the woman occupied in commerce or industry. By making rural life agreeable, and by carefully guiding the education of her children, she checks the rural exodus and conserves for the nation the most robust, healthy and moral part of the population. This is why we must accord to woman's work in rural districts the help and encouragement it deserves."

It is the realisation of the immense possibilities for development underlying the countrywoman's everyday work which has caused the Belgians seriously to set about raising the standard of efficiency in the rural population by approaching the problem more directly from the woman's side. The means by which this end has hitherto been sought fall into two main categories: professional instruction and social organisation. There are in Belgium a number of very efficient rural domestic economy schools (*écoles ménagères agricoles*); they are of two classes, permanent and temporary or itinerant,

* Mr. P. De Vuyst: "*L'éducation professionnelle de la fermière et l'amélioration de la vie rurale.*" Paper read at the First International Congress of Agricultural Associations, etc., Brussels, 1910.

ORGANISATION OF AGRICULTURAL WOMEN IN BELGIUM.



Fig. 2.—*Pavillon de la Fermière. Model Kitchen for medium-sized farm.*
A Practical Demonstration.

ORGANISATION OF AGRICULTURAL WOMEN IN BELGIUM.



Fig 3.—Group of Members of *Cercle de Fermières*, Berlaer-lez-Lierre.

and in them some 700 pupils annually receive instruction. The question of the agricultural training of girls, though very important and deeply interesting, is beyond the scope of this article, which is concerned rather with the second category mentioned above, namely, social organisation, which is a comparatively recent development and is intended to be a sort of complement to agricultural instruction proper.

Belgium is perhaps the most thoroughly "organised" of all European countries, at least in so far as the male agricultural population is concerned. Over 5,000 societies representing agricultural interests of various kinds are at work, and their total membership is something like 400,000. It is, therefore, somewhat surprising to find that the work of organising the women of rural Belgium was not seriously thought of until not quite five years ago. Up to that time it was generally supposed that the existing men's associations, such as the famous *Boerenbond* or Peasants' Union, would suffice to look after the special needs and interests of women agricultural workers as well. The principle that farming women must organise for the purpose of improving their economic position and of perfecting themselves in the knowledge required for their work, was, however, laid down and adopted at an important congress of *fermières* held in September, 1906, with the result that the first *Cercle de Fermières* was constituted some two months later. Thus was initiated a movement which already shows signs of the most healthy activity and vigorous development.

The idea of the *Cercles de Fermières* was imported from Canada, being an adaptation of the well known "Women's Institutes," which are a feature of agricultural life in the Dominion. A study of these organisations was made, during a trip to Canada, by Inspector De Vuyst, who on his return, enlisted the support of a number of agricultural instructors and other persons interested, with the result that the first *Cercle de Fermières* was founded as described. The following table shows the growth of the movement since its inception in 1906:—

Year				Number of <i>Cercles</i>	Number of Members
1906	.	.	.	2	115
1907	.	.	.	14	1,961
1908	.	.	.	36	3,931
1909	.	.	.	63	6,162
1910	.	.	.	74	6,929

We have here a record of steady, upward progress, and it is the ambition of the leaders of the movement to see a *Cercle* established in every rural parish in Belgium. In many cases where a branch of the men's *Boerenbond* already existed, the two societies have been affiliated, as the aim of each is, after all, much the same, namely, to improve the conditions of rural life. Like the men's societies, the *Cercles* may constitute themselves "*unions professionnelles*," thus qualifying for certain benefits and subsidies granted to such organisations by the Ministry of Agriculture. A monthly journal, too, has been started, which is published in a French edition as *La Fermière*, and in a Flemish edition as *De Boerin*.

An advance in organisation was marked last year by the creation of a *Comité National des Cercles de Fermières*, a central body which should have the effect of unifying and consolidating the work of the individual societies. This body is composed of delegates representing the various provincial federations, and its functions are to study agricultural, moral, social and economic questions which might be of interest to the *Cercles* in general, to organise conferences of *fermières*, to take steps for the defence of their common interests, to supply information and to act, if necessary, as intermediary between the *Cercles* and the federations to which they belong.

<p>Objects and Work of the <i>Cercles</i></p>	<p>The object of the <i>Cercles</i> is, primarily, to extend professional instruction to women in country districts by means of lectures, libraries, shows, competitions and the like. They constitute, as has been said, a kind of extension of the system of agricultural</p>
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instruction proper, whilst following at the same time a programme of a wider scope which embraces the social and moral advancement of the rural population. To quote from the statutes of a typical *Cercle*, its aim is "to instruct its members in everything which concerns the mission of the *fermière*, to seek to ameliorate her position, and to assist her towards the better fulfilment of her duties and obligations."

Each *Cercle* is administered by a committee consisting generally of an Honorary President, an acting President, a variable number of members, and a Secretary-Treasurer. The functions of committee members are purely honorary. The income of the society is derived from the members' subscriptions (usually 50 centimes or 1 franc a year), donations from associate members, and, possibly, certain Government grants.

From two to five general meetings or *réunions* are held every year, when lectures are delivered upon subjects connected with housecraft and farm work. The following figures show the increasing popularity of these meetings and lectures :—

Year	Number of Lectures delivered	Number of Persons present
1906 . . .	4	90
1907 . . .	60	3,323
1908 . . .	135	4,181
1909 . . .	212	12,447
1910 . . .	232	14,290

The lectures are always of an instructive and practical nature, but the choice of subjects is very wide. The following titles of some of the lectures delivered during the last couple of years give an indication of the great variety of subjects dealt with:—

Utility of the *Cercles de Fermières*.

The *fermière*, her mission as house-mother, house-wife and farm assistant.

Practical poultry-keeping.

The utilisation and preserving of fruit.

Butter-making.

Kitchen gardening.

The uses of vegetables.

Poultry fattening.

Stable hygiene and the rational feeding of milk cows.

Cleanliness in the handling of milk.

Advantages of co-operative dairying.

The care of young farm animals.

The preparation of food.

The feeding of children.

Diseases of children.

Anti-tuberculosis hygiene.

Care of clothes and furniture.

Farm book-keeping.

The organisation of agricultural banks.

The right investment of money, etc., etc.

Many of the lectures are given by the Government agricultural experts or by instructresses in the various rural domestic economy schools, whilst help is frequently rendered in this connection by a number of agricultural, horticultural and poultry societies. Certain medical associations, too, co-operate in the work of organising lectures upon subjects such as infantile hygiene and the best means of preventing the spread of tuberculosis. The Ministry of Agriculture also sends down lecturers from time to time in response to requests made by the *Cercles*.

As an additional means of popularising the *réunions* or general meetings, distributions of vegetable and flower seeds sometimes take place. Lotteries are frequently held, when the prizes offered are useful dairy or kitchen utensils, settings of eggs, etc. Cookery competitions, too, are sometimes organised, and prizes are awarded for the best grown vegetables and the best kept gardens. An important work already begun by some of the societies is the establishment of credit banks and old age pension funds. Other *Cercles* have purchased fruit and vegetable bottling apparatus for the general use of their members, and in some cases the bottles required for this purpose are distributed in the form of prizes. Many of the *Cercles* possess well stocked libraries of technical books which are much appreciated and freely used. Here, again, some assistance may be afforded by the Ministry of Agriculture, which, under certain circumstances, has power to establish free agricultural libraries in rural districts.

From what has been said it will be realised that the work of organising the Belgian *fermière*, though still only in its infancy, is very much alive. It has been thought out with much care and based upon sound, practical lines, which seem to hold promise of success and future development.

But after all, the Belgian movement just described is only an index of what is also stirring in many other lands, Ireland amongst the number. The movement is already a world-wide one, as is shown by the fact that at the International Congress of Agricultural Associations held in Brussels last year, an entire section (No. II.) was devoted to the rural organisation of women. In this section papers were read showing what had already been achieved in Belgium, France, England, Germany, Italy, Poland, Canada and the United States. A number of important resolutions were also passed by the Congress, including one which called upon all agricultural associations of women in every country to band themselves without delay into some form of national union or federation.

We are apparently only on the threshold of what promises to be a great and far-reaching movement, which, if rightly directed and judiciously adapted to meet the needs of each particular country and province and parish, should prove an important aid to the solution of the problem of rural life. Mutual association and the interchange of ideas, helped by a freer intercourse with other nations, have carried the farmer a long way on the path of economic progress. It is surely not unreasonable to hope that similar measures may do at least as much for his wife and daughters.

NOTE.—The Department are indebted for the illustrations accompanying this article to the Directress of the Rural Domestic Economy School at Berlaer-lez-Lierre, and to Mr. J. Giele, *Ingénieur Agricole*, Tirlemont, Belgium.

SALMON AND TROUT CULTURE.

PART II.

PRACTICAL MANAGEMENT OF A HATCHERY.

The first section* of this paper dealt in a general way with the culture of salmon and trout by means of artificial propagation.

It is proposed to treat here of some of the more important points which arise in the practical management of a hatchery. Many of them are of an elementary nature, but experience has shown that the working of a hatchery opens a marvellous field for error to a beginner, who usually takes full advantage of it.

One is often asked to recommend some book which will explain the matter in detail, and will enable a beginner entirely ignorant of the subject to become an expert by reading about it. There are many handbooks dealing with fish culture, but the points on which useful information can be given are usually obscured by the particular theories of the writer, and we would advise the beginner to leave them alone until he is able to read them in the light of some personal experience.

It is hoped that the information given below may help the beginner to avoid some of the usual mistakes.

The subject may be conveniently treated under these headings :—

1. The preparation of the apparatus.
2. The capture of the stud fish.
3. The stripping of the spawners.
4. The laying down of the ova.
5. The care of the ova.
6. The care of the fry.
7. The distribution of the fry.

1.—THE PREPARATION OF THE APPARATUS.

This will consist in the varnishing of all woodwork or zinc, the sweetening of all settling tanks or filters, and a general overhauling of all nets and gear.

Most of this preparation should be completed during the summer months, or as soon as convenient after the fry have been liberated.

There are many brands of varnish, and most of them, if carefully applied, give excellent results. Perhaps

Varnishing “Siderosthen Paint,” sold at 30s. cwt. by Messrs. Anderson, of Belfast, is as good and as cheap as any other. New zinc is coated with grease, and this must be

* See JOURNAL, Vol. XI., No. 3. p. 472.

removed before painting, otherwise the paint will not stick to it. There are various ways of removing this grease; the following method has proved very efficient at Oughterard Hatchery. Scrub the zinc with soap and hot water and washing soda. When dry brush all exposed parts (i.e., where there is no varnish in the case of trays which have been varnished before) of zinc over with a solution made as follows:—dissolve 1 part chloride of copper, 1 part nitrate of copper, 1 part salammoniac in 64 parts water. When dissolved add 1 part commercial hydrochloric acid. The zinc may be varnished twenty-four hours later, or, if a rougher surface be desired, the zinc may be put in water for a day or two (twenty-four hours after application of solution) and varnished after drying.

This mixture costs about 7d. a pint if made up by a chemist, and very much less if made up in larger quantities on the spot.

The "Siderosthen Paint" or other varnish should be applied thinly and well stippled in; after varnishing, the trays must be examined to see that none of the perforations are closed. A special thinning oil is usually sold by the makers, and good results have been obtained by thinning the "Siderosthen Paint" with naphtha.

Varnishing should not be done in frosty or very hot weather.

Perforated zinc trays must never be used until properly varnished, as bare zinc when exposed to water may become dangerous to ova that are in direct contact with it.

The woodwork of the hatching boxes after being thoroughly cleaned and dried should also receive a coat of "Siderosthen Paint."

Wooden taps in open air hatcheries should be removed, and after being thoroughly dried may be varnished on the outside. If left in position during the summer, when no water is running through them, they almost invariably split. The preparation known as "Carbolineum" has proved very satisfactory on wooden flumes or other woodwork exposed to air and water. It is not suitable for use on hatchery boxes.

Water should be run through the hatchery boxes and trays for a week before they are used.

Settling tanks must be thoroughly cleaned out at the close of each season, and, if possible, left dry for some time to sweeten. The same applies to filters, where the sand and stone used must be renewed or cleaned annually.

Hauling nets should at the close of each season be carefully dried and put away in some well-ventilated loft. Their life may be materially prolonged if they are occasionally creosoted or "barked."

2.—THE CAPTURE OF THE STUD FISH.

The stock of parent fish is usually obtained by means of an automatic trap, which during the netting season is used for com-

mercial purposes, or by the erection of a similar trap in a suitable place, or by hand nets when the fish are trying to ascend a weir, or by netting a pool when fish are resting before running up to the spawning beds.

When a trap is used there should be a safety compartment into which the fish may drop; otherwise, unless the trap is very carefully watched and frequently fished, they may be forced back against the bars.

The condition in which the fish are received in the holding ponds is of prime importance. Fish that are at all heavy in spawn, if roughly handled, are of no use for breeding purposes. The ordinary fisherman, accustomed to take fish for commercial purposes forgets this unless carefully supervised, and is well pleased if he can bring in a large number of fish irrespective of their condition. It is worth noting that the effects of rough handling on female spawners do not show externally, and are only apparent when the fish is stripped.

Whenever spawners have to be taken by means other than by hand nets or in a killing hatch, it is advisable to conduct the operations before the fish show any sign of ripeness.

Large hand nets made of soft cord and of small mesh should be used for removing the fish from the place of capture to the holding pond or tank, and the fish must be "tailed," not grasped around the gills or body when being taken from the net. The mesh of the hand nets should be sufficiently small to prevent the fish getting their heads through it, as otherwise there is a risk that the gills may be injured when the fish is being released.

When fish are taken by means of a hauling net it may happen that more are taken than can be safely carried in the tanks available. It is well to have a few floating boxes about 4' x 4' x 4' with sides and ends made of wooden slats about 1" apart.

Fish may be safely kept in such boxes until the tanks return, and this method is preferable to keeping the fish in the hauling net.

3.—THE STRIPPING OF THE SPAWNERS.

Our fish are now in the holding pond, and there is reason to suppose that some of them are ripe. This is, of course, more or less guess work, but in practice is not difficult, and can in any event be determined by experiment. A little discretion must be exercised, as the less handling the fish get the better for them. If close watch is kept they will be seen to scour and root, and occasionally turn on their sides, all of which are symptoms of approaching ripeness.

The arrangement of the holding pond varies in different hatcheries, a separate holding pond being, in some cases, provided for each

sex, but at Rockmills the males and females both share a large grated division 282 feet in length and 19 feet wide. The general plan of the pond is shown on the inset opposite; theoretically fish, when ripe, should run up through the inscales, but in practice they decline to do so, and are driven up by means of a net secured on poles at either side, and pushed forward the length of the pond by two men.

The water in the holding pond is lowered during this operation, and when the fish, forced forward by the net behind, come within a few yards of the inscales, a halt is made, and some more water let through; this induces the fish, with a few exceptions, to pass into the central pound D.

Those females that are apparently ripe or almost so are then transferred to pound C, while the male fish are put into pound E. Female fish that are obviously far from ripe are let go again into section F.

More convenient arrangements are in force at Lismore where there are separate divisions for the males and females, and subdivisions for ripe, unripe and stripped fish. The stream being narrow the impounded fish can be caught in hand nets manipulated by a man wading, examined periodically, and sorted according to their condition of ripeness.

Stripping at Rockmills is done in the open air, but at Lismore in bad weather or when daylight fails, the fish are brought in and held in two large tanks inside the hatchery. A plentiful supply of water is passed through the tanks.

The gear required in connection with the stripping of fish at Rockmills consists of:—

(1) Two large boxes which are placed on their sides on the plank platform (see Plan), overlying the upper parts of sections C, D, E, serve as a table and a shelter for the bowls of ova.

(2) Six enamelled basins about 18" across and provided with lips.

(3) Four enamelled slop-buckets with lids.

(4) Two aprons made of waterproof cloth to keep the men dry.

(5) Two or three handtowels.

(6) Straight waistcoat for holding large fish. This is the invention of Mr. FitzHerbert, of Black Castle, Navan. It consists of a number of wooden slats secured to leather straps forming a frame into which the fish are strapped and held during stripping. It is a very convenient method for holding large fish.

(7) Large galvanised tub and a supply of permanganate of potash.

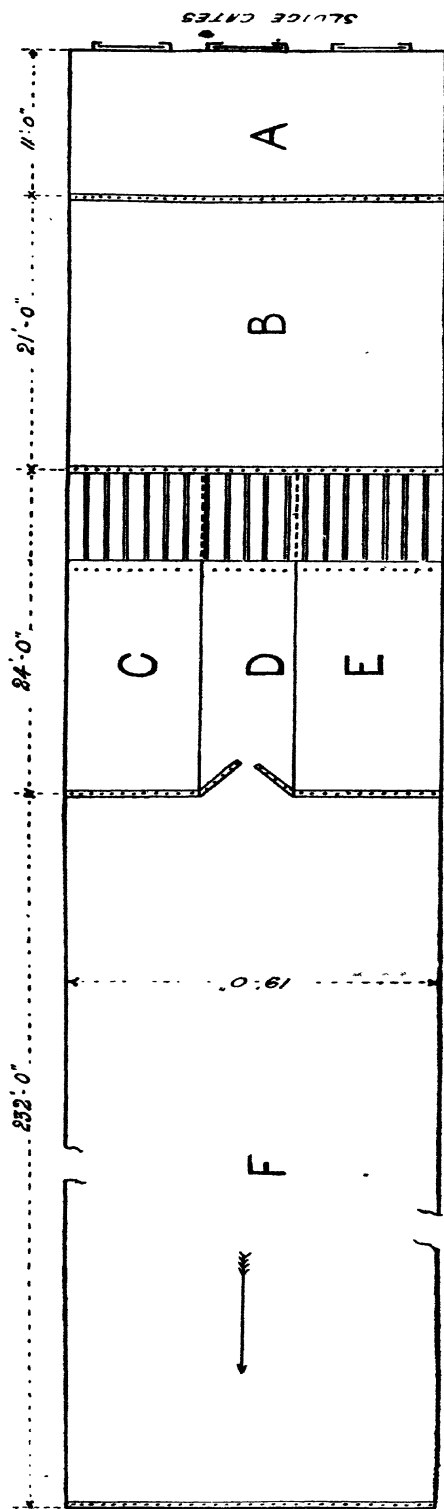
(8) A few strong goose quills.

(9) A Salter's "Baby" Balance with wicker cradle covered by a piece of flannel.

(10) Two or three landing nets.

(11) Tape measure mounted on a board.

SALMON AND TROUT CULTURE.



Plan of Holding Ponds in Mill Stream, Rockmillis Hatchery, Co. Cork.

(12) Supply of labels and apparatus for marking the fish.

(13) Hatchery book for entry of weights of fish, etc.

Our ripe female fish are at present in division C, and the supply of males in division E; for greater convenience in catching them they are driven up into the upper parts of these divisions above the drop gratings. These are shown as dots immediately below plank platform (see Plan). Two or three planks at either end of the platform are removed leaving sufficient space for a man to manipulate a landing net.

At Rockmills the permanent staff consists of one man only, who is assisted when necessary by the resident water bailiff, and when stripping operations are in progress an extra hand is taken on.

The whole work is usually supervised by an officer of the Department.

All being in readiness the men take up their position on the platform, the bailiff standing on the left (on the platform of section E. the stripper in the centre, and the extra hand on the right). The officer in charge stands behind the boxes. A female fish is taken by a landing net out of division C, and the stripper holds it by the tail over the landing net. If the fish is ripe it will, when held in this position, appear quite slack between the vent and the ventral fins, and proportionally full between the ventral or belly fins and the pectoral or side fins. This condition is fairly well shown in Fig 3.

This appearance is due to the fact that the eggs of the salmon when ripe become detached from the ovaries or roe, and lie loose, floating in the body cavity. The figure or shape of the female salmon alters according to the position in which it is held.

The same remark holds good with trout, but in small fish the appearance is not so marked.

The fish, if apparently ripe, is weighed by holding it in a landing net on the cradle of the balance. Great care must be exercised if the fish are weighed before stripping, and perhaps in most cases it will be found sufficient to weigh them when stripped.

The fish is tailed by the stripper, and the assistant passes a towel just behind the pectoral or large side fins. The object of this is to hold the fish without injuring the gills. Until the fish is actually over the basin it is best to hold it with the head lower than the tail, otherwise there is a risk of the eggs being spilt on to the ground.

No force must be used in taking the eggs, and a good practical rule to observe is that unless the fish parts with the first flow of eggs without pressure it should be put back for a future occasion. Fish may struggle for a moment or two, but this is no harm, and as soon as they become quiet, they will, if ripe, give the eggs freely.

After the first flow of eggs is finished, a slight pressure may be applied; this should be done with palm of the hand or knuckles (see Fig. 4). The fish may be stroked downwards towards the vent, but great care must be taken that the pressure does not rupture any of the small blood-vessels. It is best not to continue the pressure and stroking quite down to the vent.

In frosty weather fish may refuse to give the eggs, and they should not be forced. If the eggs are obtained by pressure before they are ripe, they are useless, and only a source of danger in the hatchery. Fish will not always be ready to give all their eggs at one time, and force must not be used to obtain them.

At Rockmills, after the fish have been stripped, it is passed on to the bailiff, who weighs and measures it. It is then marked with a numbered silver label, given a short dip in a weak solution of permanganate of potash and put over the grating into pond B. Here the water is slack, and there is no fear of the fish being driven by the force of the current against the grating. After a short time the fish recovers from the exposure to the air, and is none the worse for the operation. The stripped fish should be kept impounded for a week or so and let go in high water. Fish that have been stripped will often run upstream, seemingly unconscious of the fact that they have lost their ova.

The number of female fish to be stripped into the same basin depends on the size of the fish, and the number of cocks available. When the fish average about 6 lbs. three females may be stripped before the milt is added. The milt is obtained in much the same way as the ova, the method of holding the fish and the position of the hands of the operator may be seen from Fig 5.

The milt is applied direct from the fish to the ova, and the contents of the basin thoroughly stirred. Some people use the hand for stirring, others the tail of the fish, but a strong goose quill is as good as anything. After this has been done the basin is covered and put into a sheltered place out of harm's way. Some people add a little water to the contents but this is not necessary.

The quantity of milt required has never been exactly determined, but the proportion of one cock to about 18 lbs. of female fish seems to give satisfactory results.

Medium size cock fish (about 7 lbs. weight) are best for use, and very large, old fish should be avoided. Male fish may be used several times at intervals of a day or so, and should therefore be kept in the holding pond and not put in with the stripped female fish.

The time occupied at Rockmills in one stripping as described above is about 20 minutes, and the practice there is to leave the basin of milted ova until a second lot of fish has been dealt with.

SALMON AND TROUT CULTURE.



Fig. 3.—Ripe Female Salmon.

SALMON AND TROUT CULTURE.



Fig. 4.—Taking Ova from a Salmon.

The first lot of ova is then washed; that is, the basin is filled up with water which is then poured off, and this is repeated two or three times. After the third application the water in the basin runs off almost free from any milky appearance. An enamelled slop-bucket is then half filled with water, and the contents of the basin is gently poured in, the lid is put on, and the ova can then be safely left for any convenient time from one to four or more hours.

In some hatcheries the ova are washed once only, and then measured and laid down in the boxes.

The ova, when they come from the fish, are soft, but being provided by nature with numerous small holes they suck in water and harden rapidly.

During the process of imbibition, as it is called, the ova will stick to each other or to the sides of the basin, and it is therefore advisable to postpone laying them in the boxes until it is completed. Alternatively they may be measured and laid down in the boxes before the swelling has commenced, but it is better to allow them to swell and separate.

The time that elapses between the taking of the ova from the first fish and the application of the milt is about 15 minutes; some people may consider this too long, but in practice it is quite satisfactory. It is well, in wet weather, when the operations are carried on in the open, to keep the basin covered except when actually in use.

4.—THE LAYING DOWN OF THE OVA.

There is no hard and fast rule as to the time the milted ova should be left to swell. It is mainly a matter of convenience, and at Rock-mills the time varies from one to three hours. The only requirement is that the ova should not stick to each other or to the sides of the bucket and glass measure.

From the enamelled buckets the ova are poured in convenient quantities into one of the larger lipped basins, and from there smaller quantities can be transferred into a 9-inch lipped basin and thence into a glass measure.

These measures are graduated and contain from 20 to 40 fluid ounces. A few ounces of water are poured into the glass measure, which is slightly inclined to meet the lip of the bowl and thus prevent any shock to the ova. Ova for the first twelve hours or so after fertilisation are not easily injured if ordinary precautions are taken.

In order to obtain accurate measurements it is advisable to give the glass measure a few half-turns, when the required mark is apparently reached; the ova will settle down and more can be poured in until the right amount is obtained.

The quantity of ova to be placed in the trays will depend partly on the amount of space available. The owner should have a shrewd notion of the total weight of female fish impounded; whenever possible the weight of the fish is either taken or estimated and a note kept of it before transfer to the holding pond. Salmon may be calculated to yield about 4 to 6 ounces of washed (not sticky) ova to each pound of weight, and small trout about 1 to 3 ounces. Where any sort of tray is used a single layer is best if there is plenty of room, but this may be doubled or trebled if necessary where wire or zinc trays are used. At Rockmills 30 to 60 ounces are laid in trays measuring 17"×13½" and give equally good results. In the latest pattern box issued by the Department the trays measure 30"×12" and seem to do well when laid down with about 60 ounces of ova.

A careful record of the number of ounces placed in each tray should be kept by the manager. He will require the information later when dealing with the fry, and if the hatchery happens to be one of those subsidised by the Department it will materially facilitate an accurate estimate of the number of ova at the time of inspection.

5.—THE CARE OF THE OVA.

This work consists mainly in regulating the supply of water, keeping the boxes and trays reasonably clean, and removing any eggs that die. The amount of water, as we have already stated, depends largely on its composition, and is soon determined on the spot by experiment. The flow must be so regulated that it will not pile the eggs into heaps.

The amount of cleaning required by the boxes and trays will vary. As a rule it may be taken that it is advisable to disturb the eggs as little as possible until about the twenty-first day. It is quite allowable to raise and lower the trays gently *in the water* from the very first, but it must be done with great care, and is perhaps on the whole not generally necessary.

The removal of dead eggs each day is of great importance, as they quickly become covered with fungus and corrupt the sound eggs. If eggs with fungus are present in the tray, the owner may feel fairly sure that the attendant is neglecting his work.

Dead eggs are easily removed with the aid of a small wooden forceps made by the attendant himself, or by "soakers" composed of a rubber bulb and bone tube, or glass tubes with a bulb, over which is stretched a piece of thin rubber. These last two forms of egg pickers are shown in Fig. 6. We have seen excellent egg lifters made from a plain glass tube set in an old tennis ball. Attendants in a hatchery become adepts in the use

SALMON AND TROUT CULTURE.

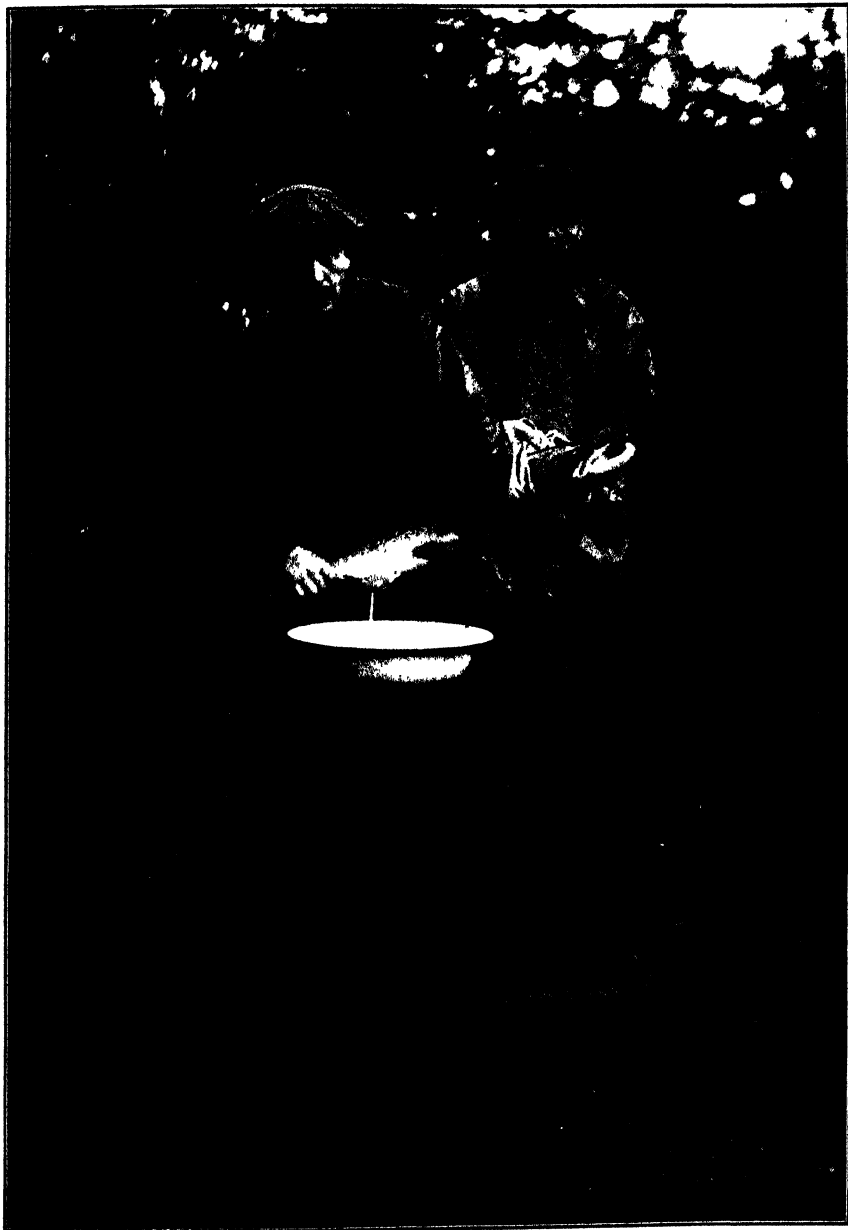


Fig. 5.—Taking Milt from Cock Salmon.

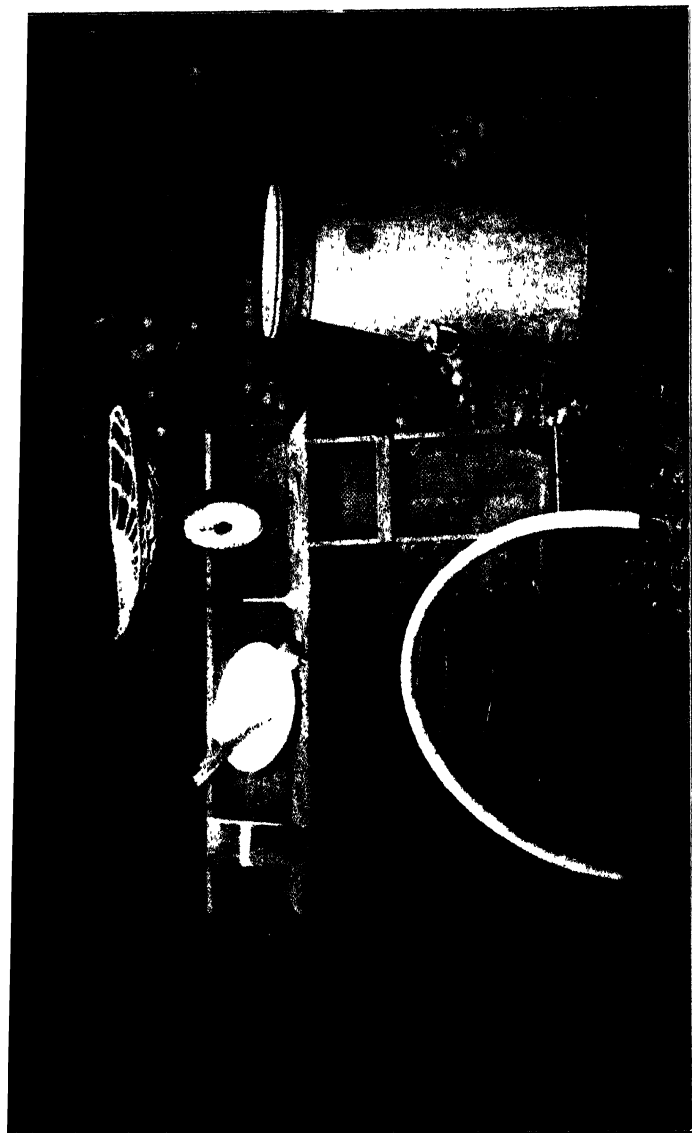


Fig. 6.—Miscellaneous Apparatus in use at Lismore Hatchery.

At back of table—Measuring board. *On table*—40 oz. Glass measure. Lipped bowl and goosequills. "Soaker", make of rubber bulb and bone tube. Egg picker with glass bulb covered with thin rubber. Salters "Baby". Balance. *Leaning against table*—Tray from Department's Hatchery box, and smaller tray of oval hole zinc from "Foley" box. *In centre*—Rubber tubing and fry pail. *On right*—Churn for carrying fry.

of their own particular instruments and decline any other, but to those commencing we would recommend the glass tube and bulb mentioned above.

Dead eggs, when removed from the boxes, should be counted, or, if the quantity is large, measured, and a record kept showing the losses in each box or tray. They should not be thrown on the floor of the hatchery or in the water near it. The cleaner the surroundings are kept the less likely they are to attract undesirable visitors such as rats or eels.

After the eggs have been laid down for about six weeks (more or less according to the water temperature) they become eyed, and can now be handled with the same ease as on the first day.

It is the custom at Rockmills to remeasure our eggs at this stage, treating them perhaps not quite so gently as when laying them down.

By this means any sickly ova are killed off, and any that are unfertilised turn white. Unfertilised ova if not handled will hold without apparent change for many months, but they usually show up white the day after being measured.

Sickly or weak ova are also killed, and it is best that they should be, as they are bound to die eventually and are most easily removed in the egg stage. This method is adopted in several large hatcheries in the North and South.

It is at this, the eyed stage, that any redistribution of the eggs in the hatchery, or transfers from one hatchery to another, are made. The oval-hole zinc trays, which are in use in some hatcheries, must now be replaced by trays with round-hole perforations, as the fry can make their escape through the oval holes and may injure themselves when doing so. Advantage can also be taken to clean the boxes out thoroughly so that all may be in order for the eggs when they hatch.

6. —THE CARE OF THE FRY.

The treatment of the fry will differ according to the pattern of box and tray used. Where flat trays, whether of wire or china, are used, the fry, shortly after hatching, will make their way out and lie on the bottom of the box, generally underneath the trays and out of sight. This makes it practically impossible to remove any that die, and they become a source of corruption. We believe it is best to retain the fry in the trays until all or most of the ova are hatched. The tray can then be inverted bodily. This method can only be adopted where trays of perforated zinc are in use. Inverting the tray in the water to turn out the fry is quite safe if carefully done, but the water in the box must be cut off temporarily, otherwise the fry will be washed down to one end. Another method

of removing the fry from the trays, and in fact the legitimate way where the Department's pattern boxes are in use, is to put in the end weir and thus raise the water above the level of the top of tray. The fry will very soon swim out, and the tray should then be removed.

Before fry are turned out of the tray the movable end weir and zinc screen (see Plan opposite) must, in the Department's pattern boxes, be fixed in position, and the central weir removed.

The object of the screen is to prevent the fry escaping from the box, and the weir at the end prevents the fry from being sucked against the zinc.

Sometimes the lower edge of the zinc guard may not fit as closely as desirable, but a little fine gravel or any other sort of plugging will put this right without difficulty.

If the lower cover is moved up a few inches above the inclined zinc screen it will be found that the fry will also move up as they always make away from the light. The shells or skins of the hatched eggs will collect on the screen and must be cleaned away. This can be easily done with a feather, or if necessary the fry can be induced, by removing more of the cover, to move into the upper end of the box, and the screen can then be lifted out and washed.

At first the fry will lie scattered over the surface of the box, but gradually they will pack into clusters. Later they "unpack" and scatter, and this may be taken as a sign that they are nearly ready to be put out.

Sometimes a sudden change in weather or fright will cause the fry to "unpack," but they soon come together again.

At Rockmills fry are put out as soon as convenient after they scatter, but the earliest lots are distributed in streams near the hatchery, and care is taken not to overcrowd the cans.

It is better to put out the fry too early than too late as they require and are able to take food some time before the yolk sac is absorbed. Some people have an idea that the fry cannot feed so long as any of the yolk sac remains, this is, of course, not correct, and fry which are held over in this way are probably stunted and come to no ultimate good.

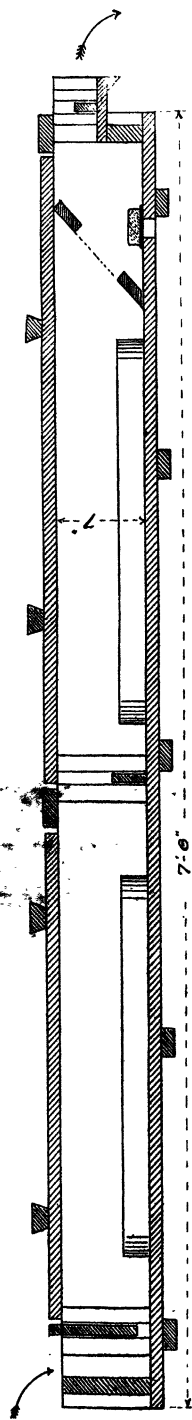
The fry should have a slightly pot-bellied appearance due to the remnant of partly absorbed yolk sac.

7.—THE DISTRIBUTION OF THE FRY.

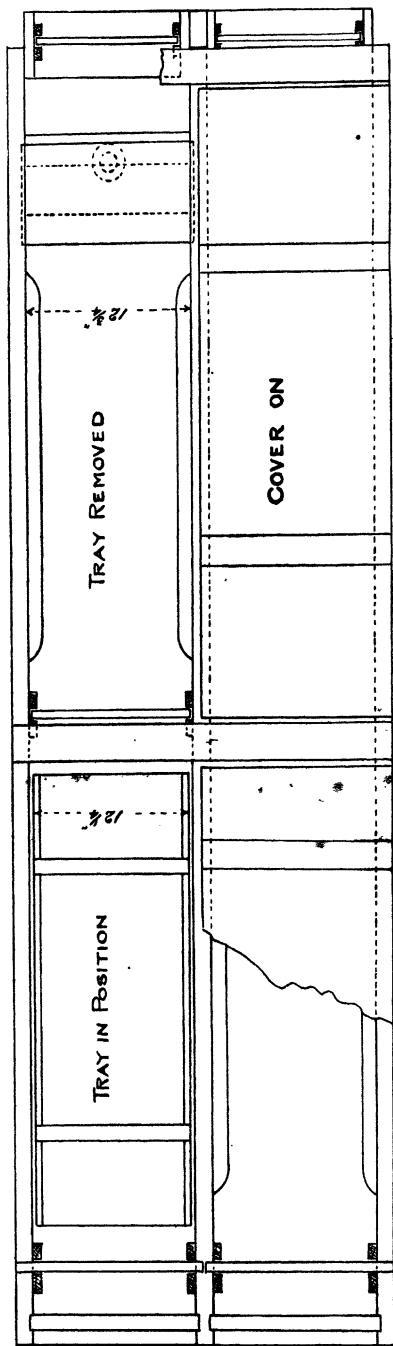
The method by which the fry are collected will depend on the kind of hatching box used. Where the eggs are hatched out on gravel the only way to collect the fry is by a scoop made of muslin stitched across a frame of stout wire.

It is a slow business, but as mentioned elsewhere this class of

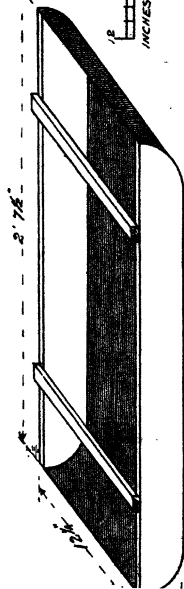
SALMON AND TROUT LAYING.



SECTION

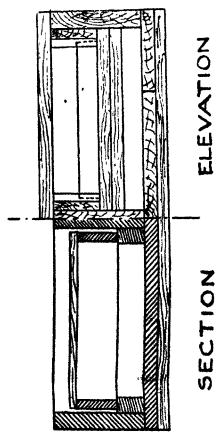
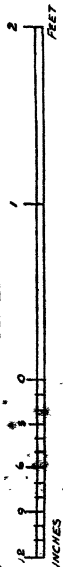


PLAN



TRAY

SCALE



SECTION

ELEVATION

Double Hatching Box—Department's Pattern.

hatching box is only suitable where comparatively small quantities of fry are dealt with. At Rockmills a large glass tube is used, about one inch in diameter, having a pear-shaped expansion about half way up. The fry are drawn in by suction, supplied by a 12-ounce rubber bulb. This is useful for collecting fry in floating redds where it is impossible to use a syphon. Where large quantities of fry have to be handled time is of the greatest importance, and the best method to employ is a syphon formed of about four to six feet of soft rubber tubing about one inch in diameter.

This would be worked in connection with a pail such as is shown in Fig. 6; it will be noted that above the top of the pail is fitted a circular band of perforated zinc, which enables the surplus water, but not the fry, to escape.

The following is the method of working a syphon:—Fill the pipe or rubber tube with water, and when full close both ends either with the finger or by bending the tube. Having done this, insert one end in the hatching box and open the tube under water. Have a pail, about half full of water on the ground or on a stand below the box, and let the other end of the tube rest in this also under water.

When the end in the pail is opened the water will flow from the hatching box through the tube, and, by moving the tube up and down the box, the fry are sucked in and arrive in the pail uninjured. The pail into which the water and fry are drawn must be at a slightly lower level than the water in the box, otherwise the syphon will not work. The most convenient height may be found by trial; the slower the water runs through the pipe the better, provided it is fast enough to collect the fry.

Where a pail with a perforated zinc guard is used the surplus water will flow off of itself, but in other cases care must be taken to prevent any water overflowing. When the water gets near the top of the pail the flow must be stopped and the fry given time to settle down before the pail is tilted or the water dipped out.

The exact quantity of fry* which may be carried with safety will depend both on their age and on the nature of the journey before them. At Lismore, where this matter is under the careful supervision of Mr. J. E. Godfrey, not more than 5,000 fry are put into a 9-gallon milk churn. Some of the consignments sent from Lismore for distribution in the streams near Mallow were examined by an officer of the Department a few years ago, and they appeared to have travelled excellently and without any loss.

* The attendant will, if he is well advised, have measured his eggs in the eyed stage, and will know the number of fluid ounces of ova in each box. The quantity of fry can be easily determined. The number of eggs to the pint may vary (in salmon) from about 2,000 to 4,000, but for practical calculations may be reckoned at 3,000.

The experience at Rockmills has shown that the same number of fry may be carried with safety in cans of about half the capacity, provided that the fry are carried on an outside car, and are not crowded into the cans until everything is ready for a start. The jolting of the car keeps the water aerated, even though the journey takes several hours. Fry carriers may be of any shape; for transfer by rail and cart the large 9-12 gallon milk churns are the most serviceable; where the fry are taken across country, milk carriers with straps for attachment to a man's shoulders are convenient, and for distribution by means of a car or spring cart, conservancy buckets made of corrugated iron have been found useful as the corrugations keep the water from dashing about too violently.

When travelling fry, more particularly in warm weather, the water in the cans should be refreshed occasionally, whenever opportunity occurs on the road. This is best done by dipping out some water from the cans and putting in the same quantity of fresh water, but not more than one-third of fresh water should be added at any one time.

On arrival at the stream where it is intended to plant the fry precautions must be taken that the temperature of the water in the cans is the same as that of the stream. It is, of course, possible to find out this by a thermometer. In practice a satisfactory plan is to stand the fry-can in the stream, and add small quantities of the stream water poured in gently. It may take from twenty to thirty minutes to bring the water in the fry-cans down to the temperature of the stream, more particularly if the fry have been sent by rail and the weather is warm.

Where small cans are used the attendant, who should wear rubber knee or thigh boots, can distribute the fry in small quantities in likely places by walking up stream and allowing the fry to swim out of the cans at intervals.

When large churns are used this method is unpractical, as they are too heavy to handle with any ease. The best method to adopt with them is to draw off a number of small (quart) cans full of fry and water and to distribute these up stream. When about two-thirds of the fry have been thus removed from the churn the cover should be put on and the churn laid on its side with its mouth up stream, and the fry will in time swim out.

There is no difficulty in drawing off some cans of fry, as they will swarm to the top of the churn if the cover is put on for a moment; tapping at the side will have the same effect.

It is most important to distribute the fry over as large an area as possible, both on account of the food supply and the loss ensuing from attacks by large trout, ducks, etc.

The best places for putting out fry are shallow streams, where

salmon spawn naturally if left alone, and where there is not a stock of large and hungry trout. Care must be taken that the streams chosen do not run dry in the summer, and it is well to avoid places where the stream is apt to overflow its banks.

It sometimes happens that it is necessary to turn out the fry in the main river ; if so, shallow, wide fords are to be preferred to deep pools.

The liberation of the fry in good order is the whole object of the hatchery, and therefore no trouble should be spared in connection with it. The owner will be well advised to supervise it occasionally himself, and see whether the fry arrive at their destination in good order.

A. B. E. H.

FRUIT CROP REPORT, MID-JULY, 1911.

The winter and early spring months were in the main favourable for a good fruit season, and at the blossoming stage trees of all kinds were well covered. On the 17th and 18th of April, however, a succession of hail showers was experienced in some districts, and did considerable injury to Damson blossoms, especially where the trees were exposed. As a result of the exceptionally dry weather and cold easterly winds during late March and April, as well as of the continued drought during May, fruit, notwithstanding an abundance of blossoms, set sparingly, or where it did set, as in the case of Cherries, dropped off in large quantities from the trees. The first period of ungenial weather appears to have weakened the blossom buds of the larger fruits, and the succeeding period of dry weather caused much of the fruit already formed to drop off. On the whole the yield of small and bush fruits has been satisfactory, but it is expected that the produce of the larger tree fruits will be much below average.

The following are the main facts concerning the several descriptions of fruit compiled from a series of reports received at mid-July from correspondents in the various counties.

BUSH FRUITS.

Gooseberry trees pulled an average crop except in a few districts.

Gooseberries Prices were better than for several seasons past, and ranged from 14s. to 23s. per cwt. (16s. per cwt. ambers, 20s. per cwt. reds); a large quantity was shipped to Glasgow buyers for jam-making.

Strawberries were an excellent crop—the best for some years.

Strawberries Owing to the drought the ripening season was short. The slight showers of rain which fell near the end of June checked damage to the fruit from mildew. Dublin market prices^{at} height of season ran from 5d. to 6d. per lb.

Raspberries gave an average to medium yield. The crop in some districts was damaged by the frosts in

Raspberries June. The price obtained by some large growers in Co. Down was 30s. per cwt. Small packed lots to local retailers brought 5d. per lb. Dublin market prices averaged about 4d. per lb.

Black Currants were a medium to good crop, but some growers complained of berries being small. In some districts the bushes were much injured by the hail showers in April. Bushes on damp soils this season gave the best yields. Fruit sold in Glasgow in chips brought 42s. per cwt. Some growers sold to Liverpool firms at £36 per ton delivered at the docks. Local prices at other growing centres (Strabane) reached 40s. per cwt. Prices in the Dublin market averaged about 4d. per lb.

Red and White Currants Red and White Currants were a good crop on the average, but in some districts not so heavy a yield as usual was obtained.

TREE FRUITS.

Apples Apples are stated to be not half a crop generally : best yields have been obtained in cultivated orchards and in sheltered plots. Co. Armagh growers report a deficient yield from the widely grown Bramley seedling variety. In some counties, notably Longford and Cavan, the crop is described as abundant.

Pears Pears have been a poor crop, and in some districts almost a total failure. Fair yields are reported on sheltered walls in some places.

Plums Plums are an under average crop on walls and in the open. Victorias have given a fair yield in some orchards : trees suffered severely from the cold, parching easterly winds of March and April, which destroyed most of the blooms, especially those of early trees on walls.

Damsons Damsons medium to poor : fruit likely to be scarce everywhere : were much injured by hail showers on the 17th and 18th of April when in full blossom.

Cherries Cherries were a heavy crop after setting, but owing to the dry weather during May and June more than half of the fruit dropped off.

Orchards do not appear to have suffered more than usual from insect and fungoid attack.

Insect and Fungoid Attacks The chief sources of injury from insect attack were green fly or aphides on black currants, the Ermine, Winter, and Codlin moths, as well as apple blossom weevil and American blight or woolly aphis on apple trees, and saw-fly on gooseberries. Black currant mite is reported to have been less prevalent than usual. The commonest forms of fungoid attack were canker and apple scab on apple trees, and gooseberry mildew on gooseberries.

CROP REPORT, MID-JULY, 1911.

Since the issue of the last report at June 1st there has been a continuation of the bright, dry weather which prevailed during May. On the nights of June 13th and 14th, however, the temperature fell very low, and though the minimum recorded at Birr Castle proved to be 40° and 37° respectively, the effects of the drop, more especially on low-lying situations, adversely affected the crops, some of which, such as Potatoes, were seriously blackened and checked in growth. Succeeding the tendency towards night frosts,

**Weather
Conditions
during
June**

a temporary change set in at the 16th and some slight showers fell. The break from dry conditions proved to be very transitory, and the small quantity of moisture which the crops received was quite insufficient to be of much benefit.

On Saturday and Sunday, June 24th and 25th, a very strong wind was prevalent over most of the country, and did considerable damage to the foliage of the Potato crop. In the west and north-western counties there were slight showers of rain intermittently during the two closing weeks of June, but this was by no means general, and was confined solely to the area mentioned. The opening weeks of July were unmarked by any change in conditions, and though in some districts of the North a few days of

**Effects of the
long Droughts**

rain were obtained round the 4th inst., the country in the main has up to the present date in the current month (17th inst.) continued to suffer from the long sustained drought. The

result of such an extended spell of unbroken weather has been that all the cereal crops, especially Oats, are expected to be under average. Hay of all kinds though splendid in quality is short in bulk; the progress of the two important root-crops, Mangels and Turnips, has been severely checked, and pastures upon which cattle are at present gaining in condition very slowly are getting brown and burnt up. Further, at the approach of mid-July many of the springs are beginning to fail, and in some districts stock-owners are at great

**Rain greatly
Needed**

pains to procure a sufficiency of water for their cattle. All round the want of a copious rainfall at this stage is badly felt, not only for the sake of some of the crops, such as Turnips, which threaten to be a partial failure, but also for the benefit of live stock of all kinds.

The Wheat crop, which is now in full ear, is generally stated to be thin. The straw will be short, but it appears
Wheat to be well headed. It is likely to ripen quickly, and the harvest will in consequence be early.

The Oat crop, especially spring sown Oats, have suffered much from the parched conditions of May and June.
Oats In those counties where winter sown Oats are grown this portion of the crop is stated to be much more promising. Ordinary spring sown Oats are, as a rule, thin and light looking, especially on poor, dry soils and on land after manuring. There will be a poor yield of straw. Indications of an early harvest are general.

Barley is reported to be the most promising of the cereals, though many fields are described as thin. As
Barley a crop it seems to have suffered less from the drought than either Wheat or Oats. It is the general impression among growers that an excellent sample of grain will be obtained this season.

Rye where autumn sown for green soiling has all been used up for the hand-feeding of stock during the
Rye spring months. Spring sown Rye, which is mostly grown in small patches on moory soils, is described as good. The nature of this season was in favour of such a crop grown on land having a large moisture supply.

Beans, which are mainly grown in certain districts of Co. Down and Co. Wexford, are stated to be variable, and
Beans have also been injuriously affected by the drought. Some fields are described as looking well, but the haulms are shorter than in ordinary years. The damage to the crop from "black collier" aphid has been less than usual.

The Potato crop suffered severely, especially on low, moory soils throughout the midland, western and northern
Potatoes counties from the night frosts which occurred on the 13th and 14th of June. On such fields the foliage was blackened and cut down. Since then considerable recovery has been noticeable, but the yield cannot be expected to be as good as if the crops had been unchecked in growth from this cause. Reports from the southern and western counties show that the high wind of Saturday, June 24th, and Sunday, June 25th, injured the foliage considerably. The crop, however, is described as looking healthy, if backward. The yields in the early Potato growing districts are reported to have been lighter than usual, though

satisfactory prices were realised. The quality of the tubers raised up to the present is stated to be excellent. The character of the season prohibited the general appearance of blight as early as in other years. (See special article on Potato Blight Appearance, pages 664 *et seq.*)

The Mangel crop is stated to be very uneven, though much favoured by the warm conditions of soil. Those fields which were sown during the last week of April appear to have come on more satisfactory, whereas those which were put in during May did not come over ground until June was well advanced. The later sowings, too, are stated to be patchy and irregular. Some damage from "fly" attack has been reported, but the injury from this source does not appear to have been so severe as last season. Only a few fields have as yet reached the singling stage. The crop is at present making little progress, but would be much benefited by rain.

The condition of the Turnip crop is still more serious than that of Mangels. Owing to the dry state of the soil at sowing time, seed germinated very slowly, and the joint effect of strong sunshine, night frosts and fly attack during June proved very adverse to the young brairds. As a consequence a large area had to be re-sown. The early sowings in some districts appear to have succeeded best. The whole crop, however, is generally very backward, and through lack of moisture is making but little progress. Unless the crop is speedily revived by a sufficient rain-fall the prospects of anything approaching an average yield are very poor.

Of the other green crops, Cabbages are favourably reported on, and are stated to be bulking well. There has been little damage done by caterpillar attack. Transplanting has been impossible for the past month owing to soil conditions. Carrots are described as average, but are growing slowly through lack of rain.

The general tone of the reports indicates that the Flax crop is looking better at this stage than might have been expected, though the view is endorsed from all the counties that many of the fields, except where especially suited by soil conditions, will pull very short. In some districts the early sown fields (those put in between March 20th to April 7th) are reported to be most promising; in other counties, however, such as Co. Down, the later sown fields (put in during the last two weeks of April) are stated to have the advantage in growth and length of stalk, inasmuch as the crop was not too

far advanced to benefit by the slight rains which occurred during the closing weeks of June.

Reports regarding the small area grown in North Mayo state that the crop shows much promise, and was much benefited by the rains of late June.

The fields in the West Cork growing district are described as looking well, and pulling was expected to begin about July 10th. Owing to the drought some difficulty in getting a sufficiency of water for steeping is anticipated.

The Hay crop, both rye grass and old meadow, will be less in bulk than in average seasons though yields in some cases have been better than expected. Cutting was begun all round much earlier than usual, and as saving was carried out under excellent conditions the quality will be prime and greatly superior to the poor nature of last year's fodder. In the seed growing counties cutting was general at the first week in July; though quality may be good, the yield of seed is expected to fall short of that obtained in previous seasons.

Pastures which were well covered during June have begun to assume a very parched appearance. As a consequence milch cattle are falling off in their milk yield, and fattening cattle are not making the progress to be expected at this stage of the season. In many cases the ordinary water supply to grazing fields has begun to run short. Since the middle of June the value of store cattle has dropped according to estimate from £1 to £1 10s. per head; dairy cattle, however, continue to make good prices; trade for all kinds of mutton, except good fat lambs, is stated to be sluggish.

REPORT ON THE PREVALENCE OF POTATO BLIGHT IN IRELAND UP TO THE 15th JULY, 1911.

The first appearance of the Blight on the Potato crop was reported a few days earlier than last season. On the 2nd of June it made an appearance at Clifden and Belmullet, and on the 5th June at Ballytrasna near Dingle. Up to the week ended 17th June four cases of attack were reported. These were located in the following counties : Galway (1), Kerry (1), Mayo (1), Waterford (1). Up to 18th June, 1910, the corresponding number of outbreaks reported was seven, and up to the 19th June, 1909, the number of outbreaks was eleven. During the week ended 24th June, one fresh attack was reported from Long Island, Schull, Co. Cork.

For each of the weeks ended 1st July, 8th July, and 15th July respectively, weekly reports were received as in former years from approximately 1,800 rural Constabulary sub-districts throughout the country. The following comparative table shows the total number of sub-districts from which blight outbreaks were reported in the corresponding three weeks of the seasons 1908, 1909, 1910, 1911 :—

1908.	1909.	1910.	1911.
104 up to 4th July	20 up to 3rd July	254 up to 2nd July	28 up to 1st July
213 up to 11th July	67 up to 10th July	513 up to 9th July	82 up to 8th July
295 up to 18th July	171 up to 17th July	678 up to 16th July	129 up to 15th July

Up to the week ended 15th July only a very small portion of the outbreaks had reference to the field crops, the attacks being slight, and occurring chiefly on the early varieties in sheltered gardens, and in plots where the crop had been grown for several years in succession. The weather in general so far has not been favourable to a spread of the disease.

ACTION OF THE DEPARTMENT.

I.—*General.*

The action which has been taken by the Department this season to secure the more general use of spraying may be stated briefly as follows :—

Over 200,000 copies of the Department's Leaflet No. 14, dealing with the prevention of potato blight and giving full directions with

regard to the spraying of potatoes, have been printed and distributed through the National Schools and through numerous other sources to farmers in every district in Ireland.

Placards reminding farmers of the necessity for early spraying and advising them to buy the raw material and prepare their own mixtures, have been displayed in every district in Ireland, and have also been sent to National Schools and to Co-operative societies.

The arrangements for testing the purity of samples of Copper Sulphate and Washing Soda at a nominal fee of 3d. per sample have been continued, and about 365 samples have already been examined.

The County Instructors in Agriculture and Horticulture, of whom 78 are now employed, have given special attention to the encouragement of spraying.

Loans are granted for the purchase of approved horse-spraying machines to persons selected by County Committees, and who are prepared to spray their neighbours' potatoes, at prices fixed by these Committees.

Twenty-five loans have been already granted.

County Committees have been empowered to purchase a limited number of hand-spraying machines to be hired out at a small daily charge to farmers and others in the poorer districts. Action in this matter has been taken by several Committees.

II.—*Congested Districts.*

Forty-three overseers and assistants and eighteen temporary Demonstrators in spraying are employed by the Department in congested districts, and, as forming part of their duties, these officers are required :—

- (a) To repair spraying machines which are out of order, charging only the cost price of new parts used.
- (b) To sell spraying machines where such cannot be obtained locally, to farmers within certain limits of valuation ; and,
- (c) Generally, to give demonstrations in spraying, as well as such instructions and advice as may be required by persons in their district.

The demand for spraying machines in congested areas has been great, and approximately 1,500 machines have been distributed this season.

It is satisfactory to be able to record that spraying has been carried out more extensively this year than in any previous year. The advantage derived from the application of the mixture by a knapsack sprayer as compared with the use of a heather wisp is

becoming more widely recognised, as is also the necessity for a second, and even a third spraying in seasons when the blight is present over wide areas at a comparatively early date. Greater care has been exercised than ever before in the preparation of the mixtures, and no complaints have been received regarding the sale of inferior spraying materials.

III.—*Potato Diseases.*

The Department are continuing their investigations relating to the potato diseases known as Black Stalk Rot, Stalk Disease, and Yellowing, which in recent years have caused considerable injury to the potato crop, particularly in the West of Ireland. A report on last year's investigations appeared in the Department's JOURNAL for April, 1911 (Vol. XI., No. 8). This report has been reprinted and a copy may be obtained free of charge, on application.

Farmers are specially invited to co-operate by sending particulars of the occurrence of any of these diseases in their districts. Specimens of diseased plants for examination and report can be sent free by letter post when addressed to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin. Such specimens should consist of the whole plant, including tubers, and should preferably be sent packed in a box.

AN EXPERIMENT IN MARKETING EARLY POTATOES.

For a number of years the Department have been pressing earnestly on the attention of farmers the importance of early potato growing, and the industry, although there is still room for considerable extension, has developed considerably. The improvement, too, has taken place, not only in the area planted, but in the methods adopted, and in the quality of the potatoes. In some districts, however, the industry has not been as successful as was hoped, and it is alleged that the cause of the want of success is—not that the climate is wrong, or the soil unsuitable, or that the farmers do not know how to grow the potatoes, but that growers experience considerable difficulty in marketing potatoes. To meet this complaint the Department have this year made an experiment in a new method of marketing. A full account of the experiment will be given later when full details are available. In the meantime the following brief statement may be of interest.

It was principally small growers that found a difficulty in placing their potatoes, and this was largely due to the fact that the small and irregular quantities which individual small growers were able to forward were insufficient for the purposes of the potato merchants and dealers.

To meet the difficulty and to help small growers, the Department appointed an officer to interview a number of such growers, and obtain information from them as to the methods they had adopted, and to suggest to them better arrangements. Such conferences were held at Sligo, Dungarvan and Youghal in March and later in May of this year. Two points were given a prominence in these discussions: first, to try and secure that Irish early potatoes should be sold as such, and not bulked, as sometimes happened, with inferior varieties from other countries; and secondly, an attempt was made to come to some agreement as to the most suitable package for forwarding early potatoes in comparatively small quantities. As a result it was decided to advise small growers to pack their potatoes in small non-returnable packages. Of such packages it was finally decided that chip baskets holding 14 lbs. of potatoes were the best, and a provisional arrangement was made with a large English buyer to take quantities of these baskets. The merits of the 14 lb. chip basket were these: such baskets would carry safely, and they would present the potatoes in a manner in which the smallest shop-keeper could

handle them—in many cases indeed the baskets were sold intact to the consumer. Another merit of the 14 lb. chip basket was this: it made it possible to definitely identify the potatoes, each basket bearing a slip stating that the potatoes were grown in Ireland and naming the districts. This helps to make a market not only for Irish potatoes, but also for potatoes from each district. A further note on the basket stated that any person using the package for potatoes other than those grown in Ireland and in the particular district from which they came, would be liable to a heavy penalty. Each basket bore in addition a statement guaranteeing that the basket contained 14 lbs. net weight.

It was thought desirable to seek an English market rather than a Scotch market for the following reasons. Glasgow is practically the best market for very early potatoes, but as the English and Scotch crops are ready almost at the same time as the Irish only a short period of high prices is possible in Glasgow, and further, as soon as the Ayrshire crop is ready the Scotch market is partially closed to Irish potatoes. Accordingly, the Liverpool market was selected for the purpose of the experiment. A considerable part of the crop sold in these baskets was sold to a leading firm of wholesale growers in Liverpool having a branch house in Swansea. This firm formerly did a large trade in Jersey potatoes, but this year they bought a considerable portion of their supplies from the Dungarvan and Lissadell (Sligo) growers packed in 14 lb. baskets as already described.

The firm report that they are completely satisfied with the experiment, and the potato growers on their part also express their unqualified satisfaction. This is gratifying, as some of the leading potato merchants when this method of packing and forwarding potatoes was brought under their notice ridiculed the idea of selling potatoes in such a package. Already, however, as a result of the season's experiment, several of these large merchants have admitted that there is much to be said for this new method of delivering potatoes to the English market.

CAERPHILLY CHEESE-MAKING IN IRELAND.

In Ireland Cheese-making has not received the attention that it deserves as a remunerative method of disposing of whole milk. The reasons for this are as follows:—(1) Cheese as a food is not valued as highly as it should be in Ireland, hence there is no great local demand for it; (2) very few are skilled in cheese-making; (3) where the type of cheese made has been of the hard or Cheddar type, the time required for the ripening of the cheese has involved the locking up of so much capital that owners of creameries, etc., have been slow to embark in the industry. There are however about half a dozen places in Ireland at which Cheddar cheese is now made, and the exports of cheese have been increasing as will be seen from the table below. The quantity and value of the imports are also shown.

TABLE SHOWING THE IRISH EXPORTS AND IMPORTS OF CHEESE.

Year	Exports		Imports	
	Quantity	Value	Quantity	Value
	Cwts.	£	Cwts.	£
1904 . . .	1,142	2,855	42,707	119,580
1905 . . .	921	2,395	41,422	107,697
1906 . . .	1,222	3,513	40,906	117,605
1907 . . .	2,460	7,134	44,445	128,890
1908 . . .	3,231	9,208	36,159	103,053
1909 . . .	4,015	11,443	42,611	121,441

During the earlier years more than half of the cheese exported was margarine cheese, i.e., cheese made from a mixture of separated milk and margarine. A small quantity of this is still made by one or two owners of factories as a means of disposing of the separated milk left on their hands. At the present time the quantity of margarine cheese made is estimated at about 500 cwts., but the trade in such cheese is not a satisfactory one, and is diminishing.

The development of the cheese industry was also hindered by the action of one or two makers who placed on the market as cheese a cheese made from half skimmed milk, or in some cases of new milk with varying proportions of separated milk added. As a result of this practice the whole of the Irish make was discredited for a time. There is no legal standard for fat in cheese, but it may safely be said that it pays better to make a full cream cheese than to make a cheese from milk mixed with varying proportions of separated milk.

From the statistics of imports it is obvious that the making of cheese could be materially increased without going outside the country for a market. Curiously enough, however, most of the Irish makers dispose of their produce in England and not at home. Owing to the universal demand from the industrial centres in Great Britain for milk, more and more of the British farmers are giving up the manufacture of cheese. This fact provides a further opportunity for the Irish dairyman. He should take up the manufacture of cheese, and take it up at once as at present our Dutch competitors are trying to secure a foothold in the English markets for Cheshire and Caerphilly cheese.

Acting on a suggestion made by Mr. J. K. Collett of the firm of Collett, Whitefield & Co. (Cardiff), Ltd., the Department of Agriculture and Technical Instruction for Ireland

An Experiment endeavoured to induce some creameries to take up the manufacture of Caerphilly cheese. In 1910 one firm having offered to provide the premises, plant, and milk for the purpose, the Department secured the services for two months of Mr. W. G. Eavis, Worthy Farm, Pilton, Shepton Mallet, Somerset. Mr. Eavis was recommended to the Department by Messrs. Collett, Whitefield & Co. as a good maker of Caerphilly cheese.

Caerphilly cheese is one of the few cheeses which can be made from winter milk, and the prices for such cheese are highest during the winter months. Another reason for choosing the Caerphilly type of cheese for experiment was that while it is a cheese of the hard or semi-hard type it can be marketed a fortnight after making, thus requiring no further working capital than is required when manufacturing butter, and it requires less initial outlay. As most of the Irish creameries have whole milk to spare in the winter months it was decided to carry on the experiment during that time.

The cheese-maker took up his duties in October, and made cheese on thirty-three days, finishing on December 23rd. In all 5,186 gallons of milk were converted into cheese, and produced 7,662 lbs. of green cheese, which weighed 7,335 lbs. dry or 1.414 lbs. of marketable cheese to each gallon of milk.

The milk from which the cheese was made contained 4.2 to 4.6 per cent. fat, and during the first half of the experiment was delivered every day and during the latter half every other day. The conditions under which the cheese-maker worked were not ideal, as cheese was made in the main dairy instead of in a special room. Accordingly the curing room could not be kept at a temperature of 55° to 65°, sometimes falling as low as 44°. Further, the milk delivered during the second half of the experiment was rather stale and contained too much acid. Still the results were satisfactory. The cheese made during the first

month was of excellent quality, and that made during the second month though not quite so good on account of stale milk, still brought very good prices. The experiment came to a close at the end of December on account of the milk supply failing.

The cheese was disposed of through Messrs. Collett, Whitefield & Co., who reported that they found quality, shape and everything exceedingly satisfactory, and that they could do a very large trade in cheese of this class and quality.

In England the cheese in transit is placed on straw in a covered wagon. It was however found necessary to pack the Irish cheese for transit, and the most suitable package was found to be a box $20\frac{1}{2}$ inches square (inside measurement) by 6 inches deep with cross pieces between the cheese. These boxes held eight cheeses each, in two layers of four, and taken in small quantities cost 8*d.* each. The transit rate was 30*s.* per ton to Cardiff.

**Packing and
Carriage**

The cost of marketing, consisting of packing, freight, commission and discounts amounted to about 6*s.* 9*d.* per cwt.

**Marketing
Charges**

The cost of the outfit to deal with 200 gallons of milk daily was £40. The brine vats and shelves were made by the local carpenter.

**Cost of
Utensils**

A Cheese-making building to deal with 200 to 500 gallons of milk should be preferably of stone, and lighted from the north, east and west, and well ventilated. If of two stories, should be about 25×25 feet, or double that if of one story, with a lean to 25×14 feet for brining room, boiler and store house.

Many creameries could easily extend their premises at a very small cost so as to convert 200 to 500 gallons of milk into cheese, and as steam-power and storage space would be available no extra provision would be needed for these.

A good maker would require to be paid 30*s.* to 40*s.* per week, and as the maker is the most important factor in the success of the business, inexperienced persons should not be employed if success is

**Wages of
Maker**

desired.

As far as this can be estimated from the information available to the Department, the cost of manufacture, including interest and depreciation, will vary from 4*s.* to 7*s.* per cwt.

**Cost of
Manufacture**

In the experiment conducted by the Department :—

		<i>s.</i>	<i>d.</i>	
Average price for cheese was	..	65	10	per cwt.
Less carriage, packing, commission and discounts		6	9	„
		59	1	
Less estimated cost of manufacture, say 6 <i>s.</i> , on				
output for year	.. .. .	6	0	
		53	1	

As 1·4 lbs. of cheese were made from each gallon of milk (4·8 per cent. fat), the milk returned $\frac{53*s.* 1*d.*}{80} = 8*d.* per gallon.$

The yield of cheese from milk depends to a very large extent on the percentage of fat in the milk, consequently the yield mentioned above cannot be expected from poorer milk. The average yield is about 1½ lbs. to the gallon. It may go down as low as 1½ lbs. when milk is at its very poorest as in spring, and rise from that figure to the yield obtained during the course of the experiment.

At present the chief centres for the distribution of this type of cheese are Cardiff and Bristol. It is mainly

**Markets
and
Prices**

consumed by the great industrial population of South Wales, but is growing in favour elsewhere.

There is no reason why a trade in this cheese should not be developed amongst the industrial population of Belfast, Liverpool and Manchester, and in Ireland replace a great deal of the imported cheese.

The prices for a first-class quality of cheese in Cardiff and Bristol markets have been as follows. Special makers have obtained higher prices.

PRICES ON WHOLESALE MARKETS FOR CAERPHILLY CHEESE.

Monthly average of the highest and lowest weekly prices. Taken from the trade papers :—

	PER CWT.															
	1908				1909				1910				1911			
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
January . . .	50	10-58	3		47	2-56	2		60	0-70	0		71	6-78	3	
February . . .	56	0-65	0		50	9-65	0		64	0-75	0		73	4-79	8	
March . . .	59	0-66	0		52	6-67	3		62	0-72	0		67	6-72	0	
April . . .	50	9-57	6		48	3-57	6		52	0-59	0		58	6-64	6	
May . . .	46	0-53	0		43	8-53	0		43	0-52	0		49	6-55	0	
June . . .	50	6-57	0		50	6-57	0		40	0-52	0		—	—		
July . . .	45	6-54	6		45	6-54	0		48	0-56	0		—	—		
August . . .	49	8-56	10		48	0-55	0		46	0-54	0		—	—		
September . . .	59	4-65	4		57	0-64	0		48	0-57	0		—	—		
October . . .	53	6-59	6		52	9-59	0		56	0-63	0		—	—		
November . . .	57	8-65	10		55	8-66	0		57	0-63	0		—	—		
December . . .	58	8-64	8		58	8-64	8		63	0-72	0		—	—		

Assuming that the yield is $1\frac{1}{2}$ lbs. cheese to the gallon of milk, marketing and working expenses 12s. 9d. per cwt., then the price must not go below 50s. per cwt. to give a return of 5d. for the whole milk exclusive of the value of the whey. Should the cheese be made in a farm dairy by the farmer's family, the expenses of making and marketing may be put at 9s. to 10s. per cwt. The whey is generally valued at $\frac{1}{2}$ d. per gallon as food for pigs.

An advantage of making this type of cheese is that the manufacture of it can be dropped should prices go too low, and the manufacture taken up again at short notice without incurring any great loss. Many of our creameries are in difficulties as to how to dispose of whole milk in the autumn and winter months. This variety of cheese offers an outlet. The whole milk purchased can be turned into cheese just at the time when prices for the cheese are reaching the highest point.

Nothing but a whole milk cheese should be made, and it should be branded "Full Cream Cheese" indicating that the milk has not been skimmed.

The Department have at present four dairymaids serving an apprenticeship in the manufacture of this cheese, whose services may be secured at the beginning of 1912 as makers of butter and Caerphilly cheese.

Appended is a note by the maker on the manufacture of Caerphilly cheese.

CAERPHILLY CHEESE.

Caerphilly cheese is one of the most useful of the newer varieties of hard and early ripening cheese, that are fast becoming so popular with the public.

As its name indicates, the variety had its origin at the village of Caerphilly in South Wales, among the Welsh farmers, and until recent years was very little known outside the Principality. During the last ten years, however, many of the dairy farmers in the famous Cheddar Valley district of Somersetshire have been induced by the increasing demand for the article to study its manufacture, with the result that it has been greatly improved, and is now fast coming into general consumption. The chief market, however, is still to be found among the miners, ironworkers and industrial classes of Wales, where scores of tons are now consumed week by week.

Caerphilly cheese, as first known, was made almost entirely of skimmed milk, and indeed was a kind of bye-product from butter making, and therefore very poor in fat and in real food value. But certain of the Welsh cheese merchants (notably, Messrs. Collett,

Whitefield & Co., Cardiff) realizing the great possibilities of the trade, if the quality could be improved, prevailed upon some of the leading Somerset makers to experiment with a cheese containing the whole cream as given by the cow. The result has fully justified their expectations, and those farmers who now make really finest full cream cheese are assured of a ready and satisfactory sale for their produce. Inferior and low class cheese containing little or no butter fat is becoming more and more a drug upon the market. The demand is not so much for a *low* priced article, as for one of quality and food value—for which the consumer is willing to pay a good price.

The method of manufacture is very simple, but considerable experience and practical knowledge is necessary

**Method
of
Manufacture** in the maker, as the treatment required varies with the different climatic conditions prevailing from day to day and from season to season.

The writer does not advise inexperienced people to attempt making Caerphilly cheese from any set of written instructions, as there are so many circumstances and influences which are vital to success which cannot be satisfactorily explained in any written treatise on the subject. A general idea, however, may be gained from the following summary :—

The milk to be dealt with is put together into a large tub or vat, and raised to a temperature of 90 degrees. Rennet is then added at the rate of one teaspoonful to seven gallons of milk. The tub is then covered with a sheet, and allowed to remain about forty minutes when coagulation should be complete. Now cut the curd through its whole depth, two ways, into four-inch squares and allow it to remain until the whey appears. Then use the curd breaker very gently, placing it into the curd and drawing it round once, commencing at the circumference of the tub and finishing at the centre. Allow curd to remain until the whey covers it, or about ten minutes. This allows the curd to harden before stirring is begun—and helps to fix the butterfat in it. This is necessary as if the curd is broken too early the butterfat is liable to escape. Now commence stirring the curd with a skimmer, and continue this process until the curd is broken down to about half-inch pieces and becomes firm and heavy and is inclined to sink in the whey. This is a most important part in the whole process, and only practice can determine how long or short is the time required to bring the curd to the proper ripeness. When stirring is finished, allow the whey to remain on the curd about thirty minutes. Then draw off whey, and place the curd into centre of tub. Now cut curd into six-inch cubes and turn—repeat this process every fifteen

minutes until sufficient acidity is developed. Now take and place into moulds and put into the presses. Apply about 5 hundredweight pressure. The moulds are usually made to contain about 8 lbs. of cheese. The cheeses remain under pressure for twenty-four hours, are then removed and placed with brine, where they remain forty-eight hours. They are then taken into the drying and curing room and placed on shelves and turned every day.

The cheese should be fit for market in from fourteen to twenty-one days.

TOBACCO GROWING IN IRELAND.

In the issue of the JOURNAL for January, 1909 (Vol. IX., No. 2, p. 228) an article appeared giving a full account of experiments in Tobacco Growing carried out in Ireland, with a detailed statement of the results obtained, and some recommendations regarding the Cultivation and Manufacture of Tobacco. It was decided to supplement the article by issuing a series of leaflets relating to the subject as under :—

- A. Introductory.*
- B. Suitable Soils.*
- C. Curing Barns.*
- D. Suitable Varieties.*
- E. Seed Beds.*
- F. Manures.*
- G. Transplanting.*
- H. Cultivation.*
- I. Harvesting and Curing.*
- J. Grading, Packing and
Maturing.*
- K. Marketing.*

The first five leaflets of this series, Leaflets A to E inclusive, appeared in the issue of the JOURNAL for April, 1909 (Vol. IX., No. 3, p. 501), and have been published in separate form; Leaflet G appeared in the issue for April, 1910 (Vol. X., No. 3, p. 471); Leaflets F, Manures, and H, Cultivation, Topping and Suckering, appeared in the JOURNAL for April, 1911 (Vol. XI., No. 3, p. 488); Leaflet I, Harvesting and Curing, appears below.

LEAFLET I.—HARVESTING AND CURING.

The operations of ripening, harvesting, scaffolding and curing are discussed generally in a pamphlet containing a reprint of the illustrated article on Tobacco Growing in Ireland, which appeared in the issue of the Department's JOURNAL for January, 1909. This pamphlet may be obtained, free of charge and post free, on application to the Department.

The leaves of the tobacco plant begin to ripen when they reach full size. Topping and suckering operations hasten

Ripening the ripening process, which consists in the accumulation in, and on, the leaf of various substances which give to tobacco its agreeable smoking properties. A period of

bright dry weather is of more benefit to the growing plant at this stage than at any other time. In fact, tobacco may lose its ripe appearance if such weather is followed by much warm rain.

There are many signs of ripeness which differ somewhat with the various types of tobacco as well as with the soil and climate. Ripeness is indicated in the leaf by curling of the edges, drooping, change in colour and texture, loss of smoothness and gloss, and increase of body and brittleness.

Harvesting Plants	Tobacco should not be harvested until the proper stage of ripeness is reached. If harvested too green it will be difficult to cure and poor in quality. If over-ripe it may be injured by brown or white fungus spots, and when cured it will be brittle
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and uneven in colour.

The leaves ripen in the order in which they develop, that is from the bottom to the top of the plant. For this reason there are two different systems of harvesting which are specially adapted to conditions and types of tobacco. All the leaves may be harvested on the stalk when the middle leaves are mature or the leaves may be gathered or "primed" as they ripen.

The stalk system requires much less labour, but the leaf system produces better tobacco of certain types, and is usually practised whenever it pays. Priming the leaves is adapted to Irish conditions as, by permitting an earlier harvest, it affords an additional month of the warmest weather for harvesting and curing. It is too expensive, however, for pipe tobaccos and is recommended only for certain cigarette and cigar wrapper varieties.

The following directions are given for harvesting on the stalk. As far as possible, tobacco should be harvested in dry weather for the reason that rain washes away the gums and oils of the leaf which are so essential to quality. Wet or cloudy weather also hinders the plants from wilting, or becoming limp, through loss of moisture. When cutting the stalk it is grasped near the top with the left hand and bent over to the left until the bottom of the stalk is exposed. It is then severed close to the ground with one blow of a hatchet. Without lifting the plants or doubling the leaves under, they should be laid at right angles to the row with the butts all one way. The plants of the next row should be laid with the butts towards those of the first row, so as to leave a passage between them. Care should be taken to handle the plants as little as possible in order to avoid breaking and tearing the leaves. The plants may lie in this position until the leaves become quite limp, though on very hot, sultry days there is some danger that the mid-day sun may scald the plants.

The best method of hanging the plants is to spear them on laths 52 inches long, 1½ inches wide, and ½ inch tick. A detachable iron

spear-point, made to fit over the end of the laths, is placed in position, and the lath is either held upright resting on the ground or is inserted in a socket in a hurdle, as shown in Fig. 13 of the Department's pamphlet on Tobacco Growing, already mentioned above. The plant is speared through the butt of the stalk, about six inches from the end, and then run on the lath. From five to seven plants, according to their size, are placed on each lath, which is then detached from the hurdle and spear and laid on the ground or hung directly on a scaffold. Any kind of strong smooth stick may be used instead of laths if loops of strong twine are placed around the butts of the stalks, about three or four inches from the ends, and the sticks passed through the free ends of the loops. This method is much inferior to spearing.

The use of scaffolds is advised in order to insure the thorough wilting of the plants without having to leave them too long on the ground exposed to wet and dirt in the event of rain. Scaffolds should be made of ordinary larch poles, or 4" X 2" scantlings, placed parallel, 4 feet apart and at least 4 feet from the ground, and supported by trestles, posts, hedges, etc. If one end of each pole is firmly supported there is little danger of the scaffold collapsing and injuring the tobacco. Scaffolds may also be made of barbed wire attached to poles which have been lashed to trees. The shelter provided by trees of dense foliage, or by overhanging hedges, will lessen the injury due to showers. Scaffolds covered with tarpaulin may be used for partly curing tobacco. When placing the laths full of tobacco on the scaffolds they should be evenly spaced such a distance apart as will permit the air to gain access to each plant and leaf. The tobacco may be left on the scaffold as long as it is doing well, but careful watch must be kept for any injury such as bruising by wind, too rapid drying, sweating, mould, or rot.

When priming is practised, several of the ripest leaves are gathered from every plant at each of the four or more operations necessary to complete the harvest. The leaves are kept in orderly piles, and transferred directly to the barn in large flat baskets or trays, which may be made to fit like drawers in a special framework attached to a cart or lorry. Sumatra leaves may be kept for several days in piles not over six or eight leaves in depth and can be strung more rapidly if slightly wilted. For the production of yellow tobacco the leaves should be strung without delay.

The method of stringing varies according to the type of tobacco.

Sumatra leaves should be strung back to back and spaced a finger-breadth apart. Samos leaves for curing bright should all face one way and be placed somewhat closer than Sumatra leaves. For curing other varieties according to Turkish methods the leaves should face in one direction and barely touch each other. For stringing Sumatra and Samos leaves a light cotton twine and a darning needle 6 inches long should be used. Small Turkish leaves require a thin flat needle and strong twine to hold the large number of leaves usually hung on each stick. The ends of the twine should be secured in slits sawn in the ends of the curing sticks. The leaves are then ready to be placed in position for curing.

For transporting plants to the curing barn ordinary carts, hay lorries, etc., may be adapted by attaching to them

Transportation a framework which will permit the plants to hang from the laths as shown in Fig. 15 of the Department's pamphlet on Tobacco Growing. Tobacco plants are in the best condition for transporting when the midribs of the leaves are not quite limp. The plants may then be hung sufficiently close to prevent chafing without danger of bruising. They may be seriously injured in transportation by careless, improper loading, by the collapsing of flimsy frames and by reckless driving over rough roads and fields. For many reasons, tobacco should not be grown very far away from the curing barn.

If possible, tobacco should never be placed in the barn when wet with dew or rain. The interior arrangement

Housing of a curing barn is explained in Leaflet D of this series. The laths holding the plants or leaves are placed in position on the tier poles by workers who stand on the tier poles and pass the laths to each other. The laths should be spaced uniformly according to the method of curing, the size of the plants and the degree of wilting. Laths holding freshly wilted plants cannot be placed closer than 6 inches apart, but they may require 12 inches if insufficiently wilted. As the laths are placed in position the leaves or plants should be adjusted so that fresh air may reach every leaf. More air is required for air curing than for curing by artificial heat. For producing yellow tobacco it is necessary that the barn should be filled promptly, and with any method of curing quick filling makes the control of curing very much easier.

The chemical changes which tobacco undergoes in curing are controlled entirely by regulating the temperature

Curing and humidity, or in other words, the heat and moisture of the atmosphere in the barn. The various means by which it is possible to exercise this control have

given rise to different systems of curing. These different systems involve different methods of regulating the condition of the atmosphere for the purpose of fixing or bringing out particular qualities in the cured leaf. Sun curing enhances the flavour. Air curing produces an elastic, absorbent leaf and preserves the natural tobacco flavour. Fire or smoke curing imparts an artificial gloss to the leaf, a pungency to the flavour, and also improves its keeping qualities. Rapid curing by means of flues or steam pipes produces bright yellow tobacco when other conditions are favourable.

The different systems of curing are adapted to different types of tobacco and should be used accordingly. Heavy, dark pipe tobaccos are either air cured or fire cured. Cigar tobaccos are entirely air cured. American bright tobacco for cigarettes is usually flue cured, and nearly all Turkish tobacco is sun cured.

The curing process proceeds by definite stages, which are very apparent to the experienced eye. Every tobacco curer must know the order in which these changes in the appearance of the leaf proceed and what conditions of the atmosphere in the barn tend to promote or retard them. The natural stages of curing are as follows :—

1st. *Wilting*.—Very soon after the tobacco plants are harvested they should lose sufficient moisture to cause the leaves to hang quite limp from the stalk. The object of wilting is to get the largest number of plants into a given space without crowding and to get rid of surplus moisture, which might later cause joint rot, loss of colour and house burn. If wilting proceeds too far, subsequent changes will take place very slowly.

2nd. *Yellowing*.—This change proceeds according to the temperature, ripeness, variety, growth and the amount of sap in the leaf. The colour of the leaf gradually changes from green to yellow. The yellow colour may appear irregularly at the tips and edges of the leaf and in spots, or the whole leaf may become yellow at once.

3rd. *Browning*.—Tobacco turns brown soon after it has yellowed. In rank, green tobacco, which cures slowly, the yellowing is sometimes barely perceptible in the form of a narrow band between the green and brown. With other kinds of tobacco the leaf may become quite yellow before a trace of brown appears.

4th. *Fixing*.—As the leaf turns brown its sap is rapidly expelled or set free, and if this "sweat" is not evaporated the leaf will first darken, then lose texture, and finally mould and decay.

5th. *Killing*.—When the colour has run and been fixed throughout all portions of the leaf, excepting the midrib and larger veins, these latter are "killed" by drying them until brittle. It is not economical to dry out the plant stalks of any type of tobacco when grown in this country. The operation of killing is, therefore, complete when

midribs of all leaves are quite dry. Technically speaking, the curing process is at an end when the midribs of the leaves are dried out, but with many types of tobacco both colour and flavour may be subsequently improved by permitting the tobacco to hang in the barn and become alternately soft and brittle by gaining and losing atmospheric moisture.

All types of tobacco tend in curing to undergo the series of changes described above, and these changes are controlled in the curing barn entirely by the regulation of heat and moisture. Heat acts directly upon the tobacco by hastening the chemical processes of curing. It also affects humidity by increasing the capacity of the atmosphere for holding moisture. Roughly speaking, this capacity is doubled with every increase of 20° F. in temperature. Humidity regulates evaporation or drying, but as the rate of curing greatly depends upon the amount of moisture in the tobacco leaves, excessive evaporation retards the process and deficient evaporation hastens it. The percentage of moisture in the atmosphere of the barn at the different stages of curing is a much more important consideration than the degree of heat present, excepting so far as temperature affects humidity. Every type of tobacco may be cured successfully within a considerable range of temperature. For instance, heavy dark tobacco may be cured at a maximum temperature of either 60° F. or 120° F. with results that are very similar. No such variation in moisture or humidity is permissible at most stages of the curing. For this reason a beginner will find a hygrometer (wet and dry bulb thermometer) a great convenience and guide in the curing, especially of bright tobacco. The difference in the temperature registered by the two thermometers is termed the wet bulb depression and indicates the humidity or percentage of moisture in the air. The hygrometer should be hung amongst the tobacco, away from the influence of draughts and direct heat. During the yellowing and browning stages the wet bulb depression should be slight, but never less than two degrees for any length of time. Depressions may be greater and more variable when fixing the colour and drying the midrib. The practical methods of controlling the curing differ essentially with different types of tobacco. This may be due to choice or necessity. In considering methods of curing in detail the first place should be given to the curing of heavy, dark pipe tobacco, which has the greatest commercial possibilities.

Air curing, supplemented by open fires, has given distinctly the greatest success with pipe tobacco. The barn recommended for this purpose is a simple wooden shed about 16 feet in height and breadth and any convenient length, with abundant controlled ventilation at the sides and ends. A barn of this type

which may be used for general farm purposes is shown in Fig. 20 of the Department's pamphlet on Tobacco Growing in Ireland. The ridge ventilator shown in the figure is not necessary. Tobacco can be perfectly cured in portable sheds, roofed with tarpaulins and walled with canvas curtains. When the plants are hung in the barn they should be spaced uniformly on laths and tier-poles so that fresh air may reach every leaf. If the tobacco is wet or imperfectly wilted it will be advisable to build small fires for a short period. Excessive firing during the early stages of curing may dry the tobacco green or cause it to cure a dark bluish colour and lose all elasticity. Should the weather be dry and warm it will be sufficient to open all ventilators and let the tobacco cure by the air alone. Within a few days the leaves should begin to change very gradually from green to yellow and brown. Plants in all parts of the barn should be watched to see that the curing proceeds uniformly and that the moisture is evaporated as fast as it is expelled from the leaves. If the upper surface of the leaves becomes very glossy or covered with tiny beads of moisture more ventilation, or some heat, is needed at once. Failure to evaporate the moisture as the leaf expels it will result in house burn, or pole sweat, which is a decay of the leaf that assumes many forms as it varies with the temperature, thickness of the leaf, and the stage at which the disease is arrested. When any portion of the leaf assumes a clear brown colour it is desirable that it should retain no more sap than is necessary to render it supple. During the browning stage tobacco sweats most freely, and some heat at this stage is nearly always necessary.

During protracted wet weather heat may be required every day or at frequent intervals. Fires should be made directly on the earthen floor of the barn or in shallow pits dug for the purpose. Many small fires are much better than a few large ones. The fires should be made by placing two large blocks of wood together and setting them alight with faggots laid between, after which they need only be kept in contact. This will furnish sufficient heat for one fire, and as many more may be used as necessary. The fires should be shifted whenever it is observed that the tobacco is curing unevenly. The fuel used may be hard-woods, peat or coke. The use of wood fires is much to be preferred as there is a large demand for tobacco cured in this manner and the smoke is a great preventive of mould. Turf smoke acts in much the same manner, but the flavour which it imparts to the tobacco is not so satisfactory. White or reedy turf is to be preferred to brown or black turf, as the latter gives off too much pungent smoke. If the tobacco should require much firing it is better to light the turf in the open in large flat wire baskets and carry it into the barn when most of the smoke has cleared away. Coke should be burnt in braziers. The most satis-

factory brazier is a discarded iron bucket with holes punched in the sides near the bottom. Only the best quality of coke should be used and it should be carefully cleared of smoke before placing it under the tobacco. It may be kindled with wood or with red hot coke, and will be clear of smoke in half an hour after charging if another old bucket without a bottom, or a section of sheet-iron pipe, is placed on top of the brazier to form a flue.

When the colour has been fixed, the midribs of the leaves should be "killed" by closing the vents and raising the temperature every few days to anything under 100° F. If the tobacco has a greenish colour, or if it is desired to mellow and improve the flavour, it may be permitted to gain and lose moisture while hanging in the barn after curing is complete. The most desirable colours for this tobacco are uniform light mahogany or cherry-root, which as a rule may be secured by keeping the tobacco in a warm, moist atmosphere until it browns, and then fixing the colour promptly. Darker colours and greater elasticity may be expected by curing more slowly with very little heat and abundant ventilation.

In curing bright cigarette tobacco of the Samos and Turcish types, the primary object is to produce a uniform bright colour in all the leaves. For this purpose it is best to gather the leaves as they become fully ripe. They should be strung within twenty-four hours, and the barn filled in one day. The most suitable curing barn is of tight construction, perfectly controlled ventilation, and heated by steam as described in Tobacco Leaflet C. The leaves should be carefully spaced on the twines so as to barely touch each other. The laths should be placed so as to provide free circulation of air. Their number should depend upon the heating and ventilating capacity of the barn. The curing is begun by raising the temperature rapidly to about 80° F. and regulating the ventilation so that the wet bulb thermometer shows about two degrees depression. These conditions of heat and moisture are maintained for about twenty-four hours, according to the tendency of the tobacco to sweat and turn yellow. It is usually possible with ripe tobacco to gradually increase the depression of the wet bulb thermometer to four, or even ten, degrees, by the end of the yellowing period. When the green colour has almost completely given place to yellow the temperature should be advanced within a few hours to 130° F. or above, and ventilation increased so as to secure 30° depression or more. If this great depression can be obtained at temperatures around 130°, by means of ventilation, it is not likely that the leaf will turn brown before the yellow colour can be fixed. The fixing of the colour may require eight to twelve hours, after which a continuation of this temperature will "kill" the leaves completely in twelve to eighteen hours. It is possible to complete the

cure in forty-eight hours, and easy to do so in seventy-two hours. Attractive, mottled colours may be obtained by curing at lower temperatures if the air is always kept dry as possible by carefully regulating heat and ventilation.

All cigar tobaccos should be air cured. The Sumatra variety for cigar wrappers should be primed when the leaves are barely ripe. The leaves should be strung as previously described and most carefully spaced and hung in the barn, which should be so situated and ventilated as to obtain every advantage for drying. Heating will be necessary late in the season and in very damp weather. Moderate temperatures should be maintained by means of smokeless fires of coke or very dry wood, though stoves having the flues run almost horizontally under the bottom tier of tobacco are most satisfactory. Cigar tobacco cures in much the same manner as pipe tobacco, though the leaves, being more delicate and thin, are much more likely to dry green and less liable to house burn and mould. It is very hard to prevent the late primings from curing green as cool weather is more favourable to drying than to the chemical changes which produce desirable colours. If heat is applied to very thin tobacco during the early stages of curing it will increase the tendency to dry green unless ventilation is very slight and temperatures moderate. House-burn may usually be avoided by proper ventilation. Mould will attack the leaves if the colour is not fixed and the midribs killed promptly. If ventilation will suffice until the fixing is nearly complete the laths may be shifted close together and the curing completed very cheaply and without injury by means of stoves.

G. N. KELLER.

The following is a list of the Department's leaflets on Tobacco Growing in Ireland :—

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| A. Introductory. | G. Transplanting. |
| B. Suitable Soils and their Treatment. | H. Cultivation, Suckering and Topping. |
| C. Curing Barns. | I. Harvesting and Curing. |
| D. Suitable Varieties. | *J. Grading, Packing and Maturing. |
| E. Seed Beds. | *K. Marketing. |
| F. Manures. | |

(Leaflets marked * are in course of preparation.)

Copies of the above leaflets can be obtained free of charge and post free on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin. Letters of application so addressed need not be stamped.

GROWING TOBACCO FOR NICOTINE PURPOSES.

The value of tobacco as an insecticide has long been known but only within recent times has an extract of pure nicotine been used extensively for this purpose. Nicotine has no superior as an insecticide, for use in horticultural work and as a sheep dip, and the demand at present is limited only by the small supply and consequent high price. The demand has now reached such dimensions that all available waste tobacco of sufficient strength is used for nicotine production, and the manufacturers are seeking for a more extensive and reliable source of supply than is afforded by the waste tobacco from factories and warehouses which during periods of scarcity commands good prices for smoking purposes.

The possibility of growing tobacco at a profit specially for nicotine production has been investigated in several countries with results that have not been encouraging. Valuable information has been obtained, however, as to the best soils, and varieties; the most effective methods of manuring, planting, and topping, and the proper time for harvesting. In 1909 the Department ascertained the nicotine content of the most promising varieties when grown on different soils in Ireland. They found that cured plants of the very hardy species *Nicotiana rustica*, which has perpetuated itself in Ireland since 1830, contained 6.53 per cent. of nicotine. On account of its hardy and vigorous growth this species appeared best adapted for the production of nicotine. The effects of soils on the nicotine content of the plant indicated that suitable bog land could be more profitably used than upland. Bog land would have the additional advantage of being near peat fuel which could be used for curing or for the process of extracting the nicotine from the plant.

During the season of 1910 the Department tried an experiment in the growing of *N. rustica* and Yellow Pryor for

An Experiment nicotine production on one acre of heavy upland.

The commercial results, which are appended, lead to the conclusion that it is not commercially profitable to grow tobacco for nicotine production and cure and handle it in the ordinary manner, for the reason that it thereby costs nearly as much to grow tobacco for nicotine as for smoking purposes, while a proportionately higher price can be obtained for smoking tobacco. The whole question hinges, therefore, on the cost of production, but investigators have not applied themselves so much to reducing the cost as to increasing the yield of nicotine. In the course of the Department's experiment of last year it became evident that the cost of production could be

materially decreased by eliminating the usual operations which follow harvesting, and a preliminary test in this direction was made with encouraging results. It is intended, therefore, to try an experiment this season in producing tobacco extract directly from fresh leaves; and then sell the extract instead of the cured leaves to the nicotine manufacturer.

Chemical tests indicate that there is some loss of nicotine in the drying and curing of the plants, and if this be true generally, the total yield of nicotine per acre should be increased by the method of production now proposed.

RESULT OF EXPERIMENT CARRIED OUT IN 1910 IN THE GROWING OF TWO ROADS *N. rustica* AND TWO ROADS OF YELLOW PRYOR TOBACCO FOR THE PRODUCTION OF NICOTINE.

Expenditure.

	£	s.	d.
Seeds, beds, preparation of land and manures ..	7	15	7
Planting and cultivation	2	14	5
Harvesting	2	0	0
Curing	2	10	0
Stripping, baling and packing	2	0	5
Marketing	0	10	0
Rent, Rates and Taxes	1	3	0
	<hr/>		
TOTAL EXPENSES ..	£18	18	5

Receipt.

1,271 lbs. tobacco, sold at 3d. per lb. ..	£15	17	9
	<hr/>		
Loss ..	£2	15	8

NOTE BY GROWER.—The season was very unfavourable, the tobacco having to be harvested prematurely. As a result, the nicotine content was considerably lowered—notwithstanding this the purchaser reported fully 5% of nicotine and expressed his entire satisfaction with the tobacco. The *Rustica* variety is distinctly superior for this purpose, and lower “topping” with a favourable season should give a higher percentage of nicotine. Cost of production may also be lowered.

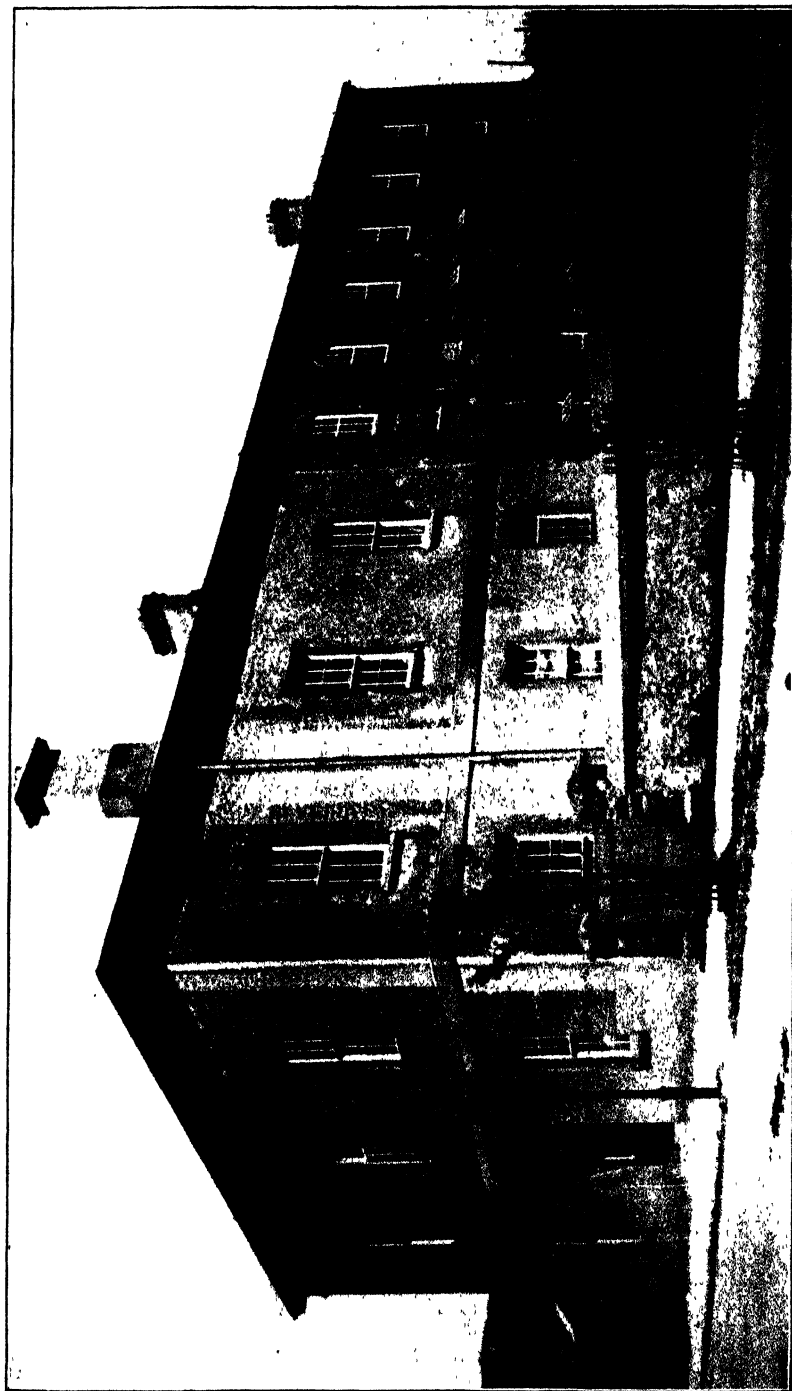


Fig. 1.—Perspective View of the Building.

TECHNICAL INSTRUCTION IN IRELAND.

[* * * *The following is the tenth of a series of articles which has been appearing in the JOURNAL on some recently established Technical Schools in Ireland. These descriptive articles relate to centres differing widely in population and needs, and it is believed that they will be of interest and value in view of future developments in towns in which permanent buildings have not yet been provided. Five of the articles dealt with the Belfast Technical Institute, the Technical School, Ballymoney; the Central Technical Institute, Waterford; the Municipal Technical School, Dundalk; and the Municipal Technical School, Londonderry.* These buildings were new. Four of the articles dealt with buildings already erected, but adapted to meet the needs of Technical Schools in Ballymena, Queenstown, Newry, and Newtownards.† The article below relates in like manner to a reconstructed building—the Municipal Technical School in Clonmel.*]

TECHNICAL INSTRUCTION IN CLONMEL.

BY CECIL WEBB,

Principal of the Technical and Day Trades Preparatory Schools.

In the normal condition of affairs the characteristic of a good scheme of Technical Instruction is that it ministers

Introductory to the growing needs of a growing community.

If it intelligently meets those needs, its success is assured, and year by year it is possible to record steady progress and a widening sphere of usefulness. In the towns of the South of Ireland, however, Technical Instruction often finds a more difficult task, namely, to arrest decay and rekindle hope in a declining and disheartened population. Technical Instruction alone cannot accomplish this, but it certainly can be made a most important means to that end. Clonmel presents this problem in intense form, and before considering the record of the work in the town during the past eight years, it would be well to glance at the economic condition and history of the Borough during the past sixty years. This will enable us to gauge more truly the value of the work which is being done, and should act as a guide in helping to decide in what direction efforts should be concentrated in order that Technical Instruction should do for the town the utmost of which it is capable.

* See issue of Department's JOURNAL for April, 1907, Vol. VII., No. 3, page 457; for July, 1907, Vol. VII., No. 4, page 652; for October, 1907, Vol. VIII., No. 1, page 11; and for July, 1908, Vol. VIII., No. 4, page 666.

† See issue of the Department's JOURNAL for January, 1908, Vol. VIII., No. 2, page 260; April, 1908, Vol. VIII., No. 3, page 465; and October, 1908, Vol. IX., No. 1, page 76; Vol. XI., No. 3, page 462.

PART I.—HISTORICAL.

The year 1850 saw Clonmel a thriving and industrious community of about 16,000 people.* In flour milling it was one of the most important centres in the United Kingdom, and in tanning it possessed eight or ten large and thriving yards. These were the staple industries, but they were supplemented by numerous other crafts, ranging from Foundry work to Cutlery, Rope-making to Coach-building, House-building to Cabinet-work. In all these trades there is ample evidence to show that the town took an exceptional place for the excellence of its workmanship. The Mechanical Society was so strong that it had just erected a large building containing Library and Reading Rooms, Lecture Hall, Art and other classrooms for Day and Night Schools. Lectures were, from time to time, delivered by members of the Royal Dublin Society, and by the Lecturers of the Society of Arts of London. The Reading Rooms provided twelve Newspapers and fourteen Periodicals of serious literature. Progress was made, and, in the year 1858, an exhibition of works of decorative art was organized, at which, in addition to a very valuable contribution from the Government Museum at South Kensington, there were also 337 local Exhibits including Painting, Engraving, Bookbinding, Photography, Statuary, Carvings, Furniture, Silversmith-work, Cutlery, and Textiles.

The extremely rich land of the surrounding country supported a large population, which supplied the town with the raw materials of its staple industries, used the town as the natural trading centre, and purchased much of that which was manufactured. From reasons over which the town had no control, the land passed out of cultivation and relapsed to grazing, the population of the surrounding country crossed the Atlantic, the staple industries of milling and tanning failed, carrying with them practically all the subsidiary industries. The population of the town gradually sank to about 10,000.

The Mechanical Society was broken up, the Art, Day and Night Schools closed, the Library decayed, and the Mechanics Institute merely provided accommodation for companies of travelling players.

In 1899, however, the Corporation took over the Library under the Libraries Act.

So matters stood in 1902 when a Committee was formed, with the Town Clerk as Secretary, to establish a Scheme of Technical Instruction under the Department of Agriculture and Technical Instruction for Ireland. A scheme was carefully drafted and put into operation. A portion of the old Mechanics Institute was

* Population, 1821, 13,012; 1831, 15,134; 1841, 20,917.

TECHNICAL SCHOOL, CLONMEL.

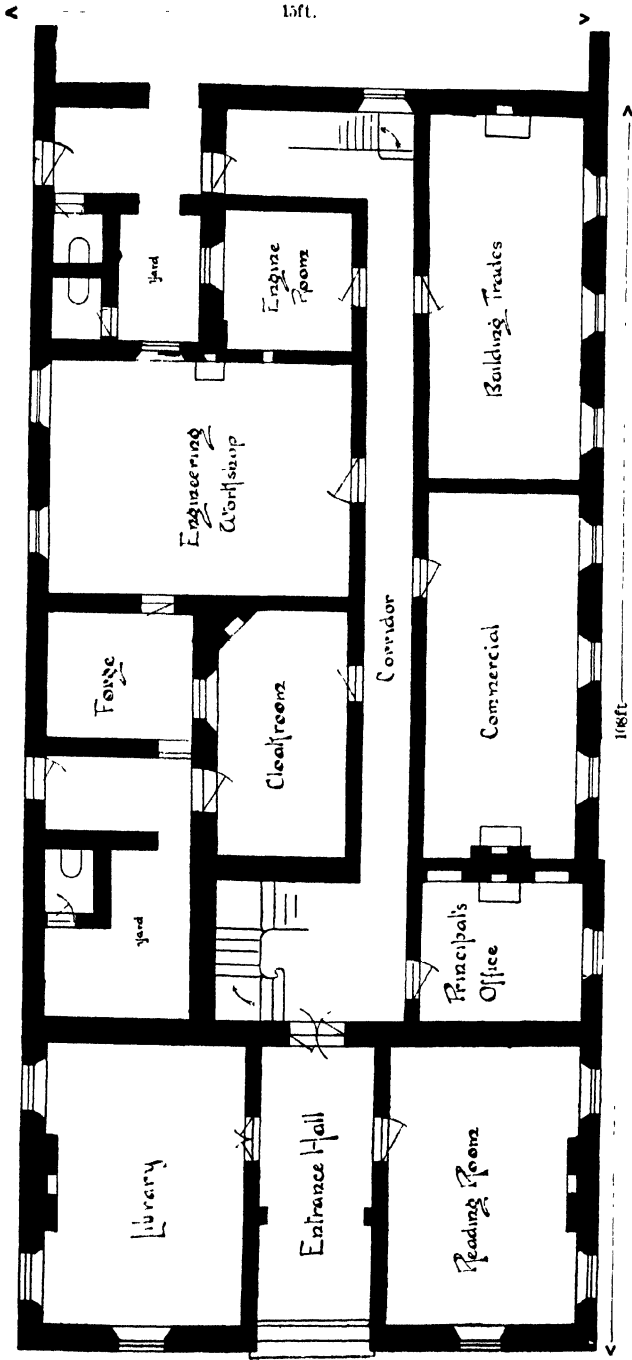


Fig. 2.—Ground Floor Plan.

TECHNICAL SCHOOL. CLONMEL.

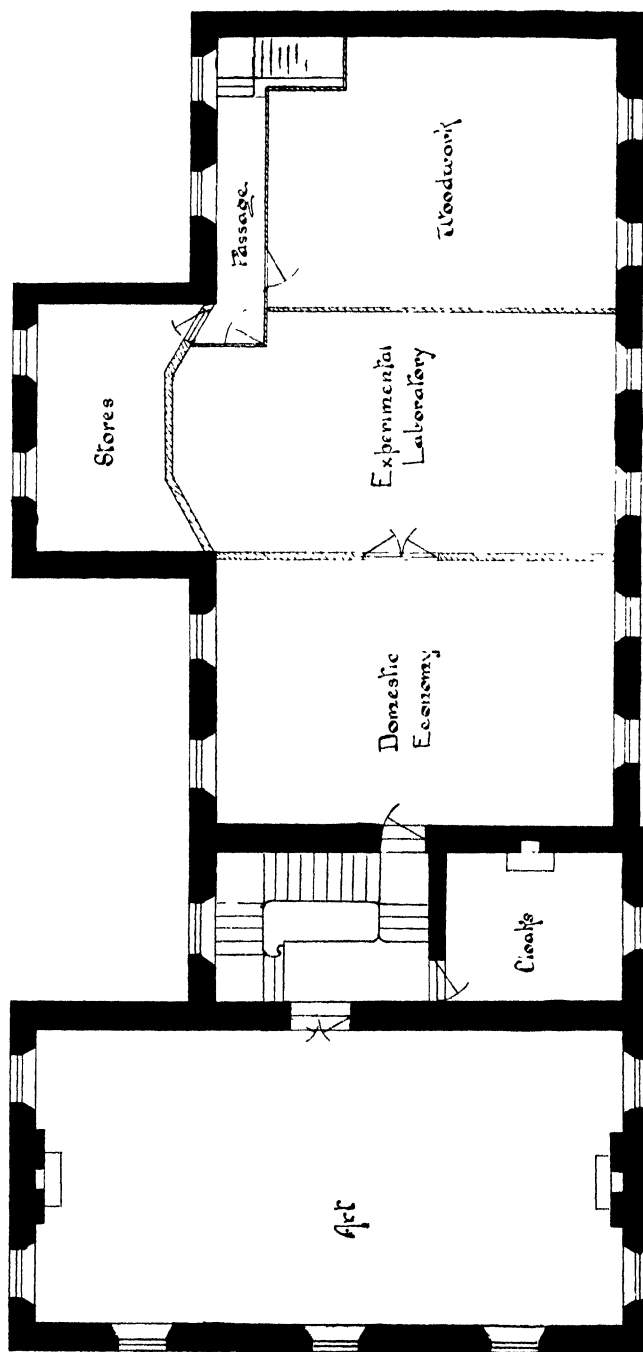


Fig. 3.—First Floor Plan.

obtained at a rental of £50 per annum. This was fitted up for the use of some of the classes, and was called the Central Technical School. It provided for classes in Woodwork, Metalwork, Building Construction, Art and Commercial Work. Classes in Domestic Economy were held at one of the Convents which had received an equipment grant. Art classes were also conducted by the Committee's teacher in two Convents, the Christian Brothers' three schools, and in the Grammar School. In addition classes in Manual Work were carried on by the Committee's teacher in the Christian Brothers' Schools.

The Scheme stood in this form until 1906, when it was felt that the work was cramped for want of proper classrooms and equipment at the Central School, and that as the various secondary schools were, for the most part, then provided with teachers qualified to carry on the work which had formerly been done by the Technical Teachers, it was desirable and opportune to more properly centralise the work, and to concentrate the teachers' attention upon purely Technical Instruction. The Department then made a special grant of £200 to assist the Committee in bringing the whole of the Mechanics Institute into a condition in which it could be occupied for classes. The effect was soon seen in the increased class entries, and the highly gratifying successes which the students obtained in the annual examinations conducted by the Board of Education, South Kensington; the City and Guilds of London Institute; and the Royal Society of Arts. By 1908 the attendance at the Committee's classes had more than doubled what they were in 1905. A Day Class for Apprentices was formed, and met on three afternoons per week, and a number of employers sent apprentices from their workshops. This class was continued from 1906 to 1909. In 1909 it had to be closed temporarily owing to the over-working of the teaching staff. It is hoped, however, that this Day Class for Apprentices may be opened again when the present teaching staff can be augmented.

The work of the Technical School having made such good progress, it was decided by the Committee to approach the Department with a view to the establishment of a Day Trades Preparatory School; and in 1909 a Scheme was prepared, approved by the Department, and put into operation. Entrance to the Day Trades Preparatory School is obtained by competitive examination, and it is highly satisfactory to find that the type of boy presenting himself for entry to the school at Clonmel is well above the average, mentally and physically. The success of the Day Trades Preparatory School has necessitated the further remodelling of classrooms and the provision of an Experimental Laboratory. Plans for carrying out this work were

prepared by the Principal in the spring of 1910, and the Local Government Board sanctioned the raising of £450 by loan for the purpose. Owing to a temporary wave of good trade in building it was possible to obtain only one tender, and that being above the estimated cost of the work, the Committee decided to defer the raising of the loan, and to allow the Principal to carry out such alterations as he considered urgently necessary by means of direct labour, and, if possible, out of revenue.

The cost of the work thus carried out has been : structural £65, equipment £156. The total amounts expended under these heads since the establishment of the School in 1902 stands at (about) structural £300, equipment £660.*

The structural alterations to the building and the equipment of the School have thus been effected step by step, as growing requirements urgently dictated.

The greatest economy has been exercised throughout, and, as shown by the accompanying plans and views, the town is to be congratulated on the possession of a really good school at a rental of £50 per annum, and the small capital charge mentioned above.

One advantage of this gradual development has been that the students have, to a certain extent, assisted in the equipment of their own classrooms. This is particularly so in the case of the Metal Workshop and the Experimental Laboratory. Furthermore, the borrowing powers of the Committee remain unimpaired, and should the development of a local industry require it, the committee would be in a position to render very considerable assistance by building and equipping further classrooms which should provide for the training of workers.

A special feature of the scheme in Clonmel has been the attempt to make the instruction in the School a means of reviving the Road Carriage Building industry, which still existed in the town in a precarious way. A local carriage builder, who from the first had been an excellent student in the Science and Art Classes in the School, recognizing the possibilities of Technical Instruction to the trade, set himself to obtain a First Class Honours Certificate in Road Carriage Building. A class in Coach Building was formed and he was appointed teacher. The effect upon the local industry has been most gratifying. The design and construction of cars have greatly improved. At show after show through the country Clonmel cars have carried off the prizes. Their reputé has spread, and summer and winter the coachbuilders in Clonmel are now kept busy. Such an effect could only be attained by the technological training which the School provided, being backed by enterprise and perseverance on the part of those engaged in the trade.

* This item does not include a sum of £395 paid to the Secondary Schools as equipment grant, but all renewals, etc.

TECHNICAL SCHOOL, CLONMEL.

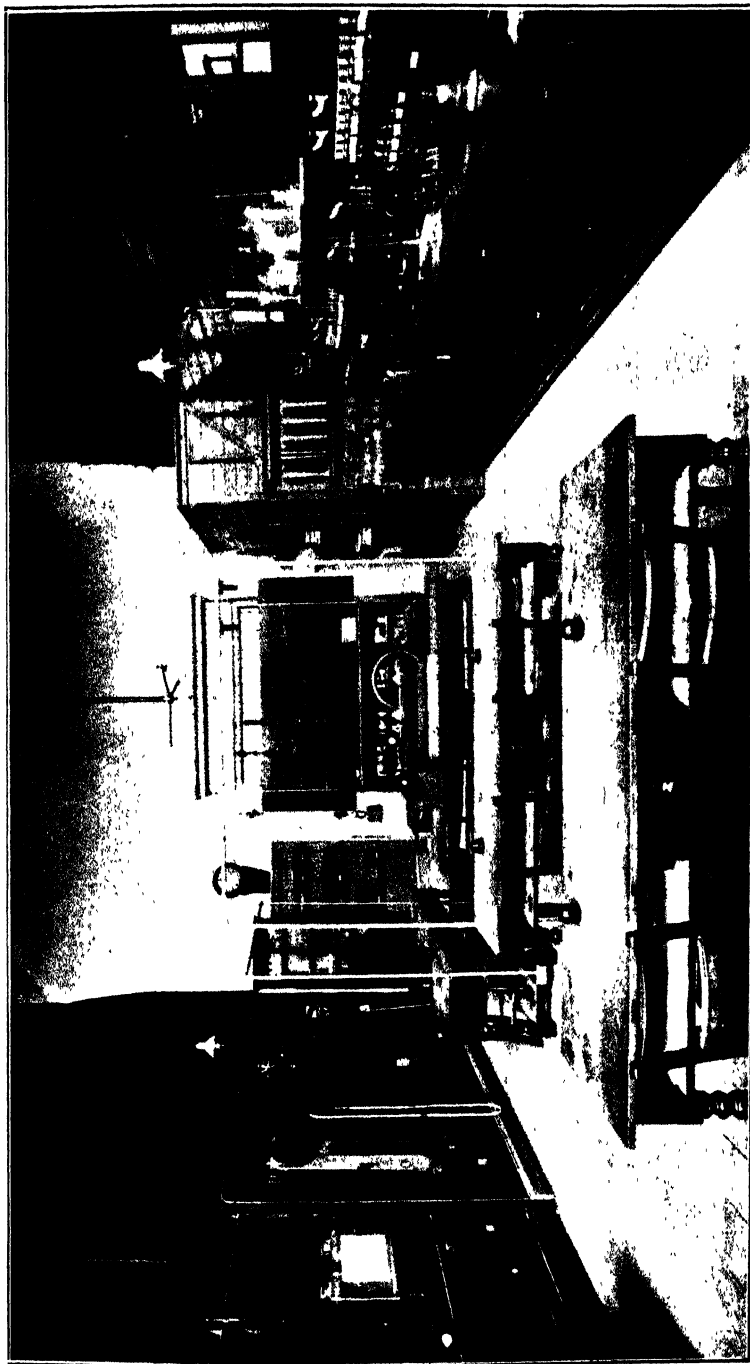


Fig. 4.—Experimental Laboratory.

TECHNICAL SCHOOL, CLONMEL.

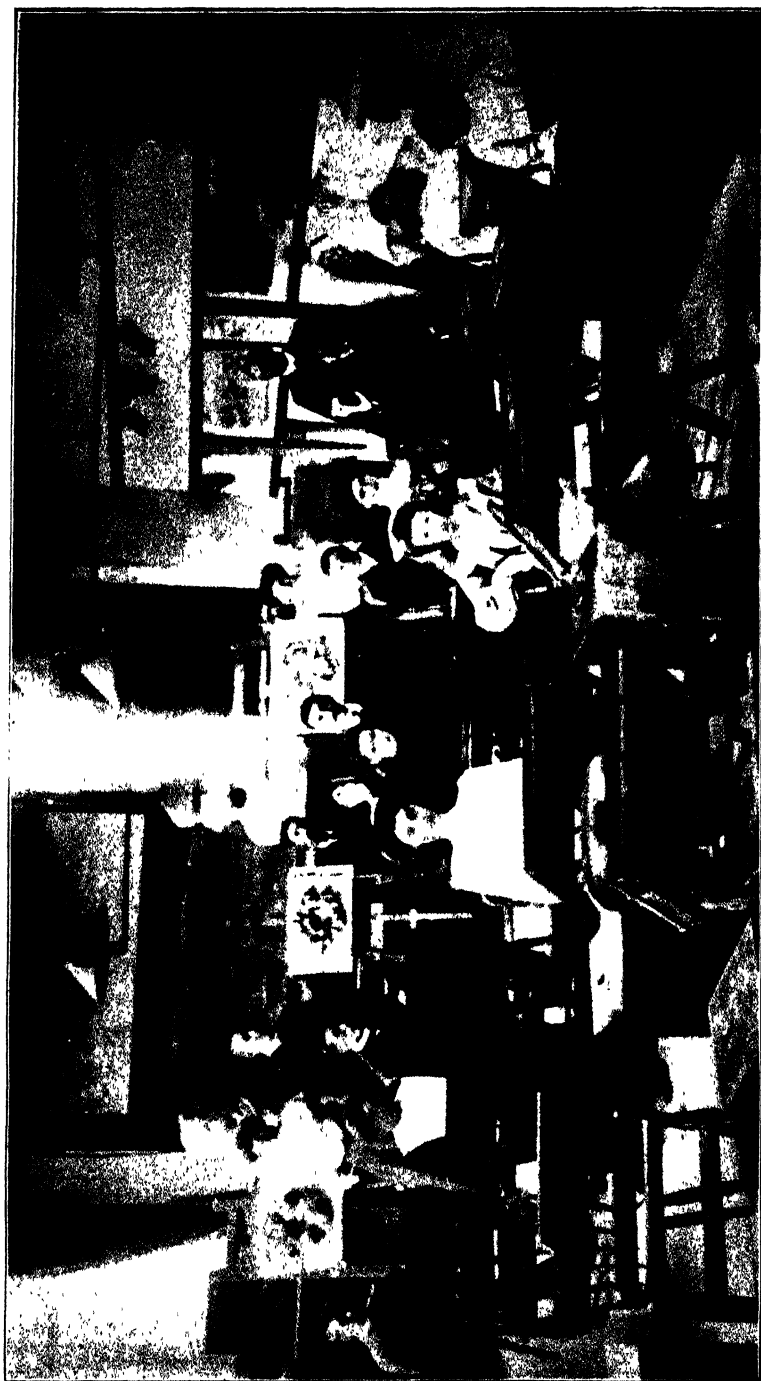


Fig. 5.—Art Room.

PART II.—STATISTICS.

It is instructive to compare the Financial Statement for the Session 1904-5, when the School had been working two years, with that for the current Session, when the scheme has been in operation eight years.

FINANCIAL STATEMENT FOR 1904-5.

Estimated Income.

Contribution from Rates	..	..	..	..	£77
Fees	..	..	..	..	40
Department :—					
Endowment	..	..	..	..	500
Science and Art Grants	..	..	..	..	20
From external Schools for services of Art and Manual Work Teachers	..	..	..	..	30
From Tipperary S.R. County Committee for half Salary of Domestic Economy Teacher	..	..	..	..	45
Rents, Sales, etc.	..	..	..	..	10
					<hr/>
					£722

Estimated Expenditure.

Salary of Principal	..	..	..	..	£200
Salaries of other Teachers	..	..	..	..	275
Caretaker	..	..	..	..	15
Fuel, Light and Cleaning	..	..	..	..	38
Rents and Insurance	..	..	..	..	50
Equipment	..	..	..	..	5
Administration, liabilities in respect of former years, and various expenses	..	..	..	..	139
					<hr/>
					£722

FINANCIAL STATEMENT FOR 1910-11.

Estimated Income.

Contribution from Rates	..	..	..	..	£78
Fees	..	..	..	..	40
Department :—					
Endowment	..	..	..	..	525
Science and Art Grants	..	..	..	..	300
Day Trades Preparatory School	..	..	..	..	389
Sales	..	..	..	..	5
From external Schools for service of Art Teacher	..	..	..	..	7
					<hr/>
					£1,344

Estimated Expenditure.

Salary of Principal	£225
Salaries of other Teachers	609
Scholarships and Prizes	95
Fuel, Light, Cleaning and Caretaker	95
Rents and Insurance	51
Equipment	40
Class Materials	55
Building, etc.	30
Administration and incidental Expenses	100
*Repayment of Loan and Interest	30
	<hr/>
	£1,830

The occupations of the students in each year were as follows :—

Occupations	1902-3	1903-4	1904-5	1905-6	1906-7	1907-8	1908-9	1909-10
MALES								
Builders	10	8	5	9	24	29	16	16
Coachbuilders	—	6	3	3	14	15	14	12
Engineers	4	2	—	4	10	18	11	11
Painters	2	—	3	3	3	1	3	3
Plumbers	4	4	2	1	4	3	2	2
Jewellers, etc.	8	6	2	1	1	4	2	3
Clerks	22	17	13	10	8	15	7	12
Salesmen	14	13	11	3	—	10	5	9
Teachers	8	8	7	5	6	8	5	5
Not included above	11	13	12	10	11	21	7	18
Just left School	5	1	—	—	5	9	8	—
Still at School	13	11	19	10	10	12	24	10
Totals	101	89	77	59	96	145	104	101
FEMALES								
Domestic Servants	7	4	1	2	7	12	7	6
Dressmakers	—	—	2	—	—	10	10	9
Clerks	10	15	1	5	9	6	9	7
Saleswomen	23	13	6	3	9	14	10	26
Laceworkers	—	—	—	—	47	80	87	80
Teachers	14	9	2	—	6	6	9	13
Not included above	93	20	11	8	8	13	5	11
No occupation stated	89	40	47	64	31	48	31	43
Just left School	—	6	—	3	3	59	16	2
Still at School	—	77	70	55	61	32	25	63
Total Females	241	184	140	140	181	280	209	260
Total Males	101	89	77	59	96	145	104	101
Sum Total	342	273	217	199	277	425	313	361

* This loan not taken up.

TECHNICAL SCHOOL, CLONMEL.

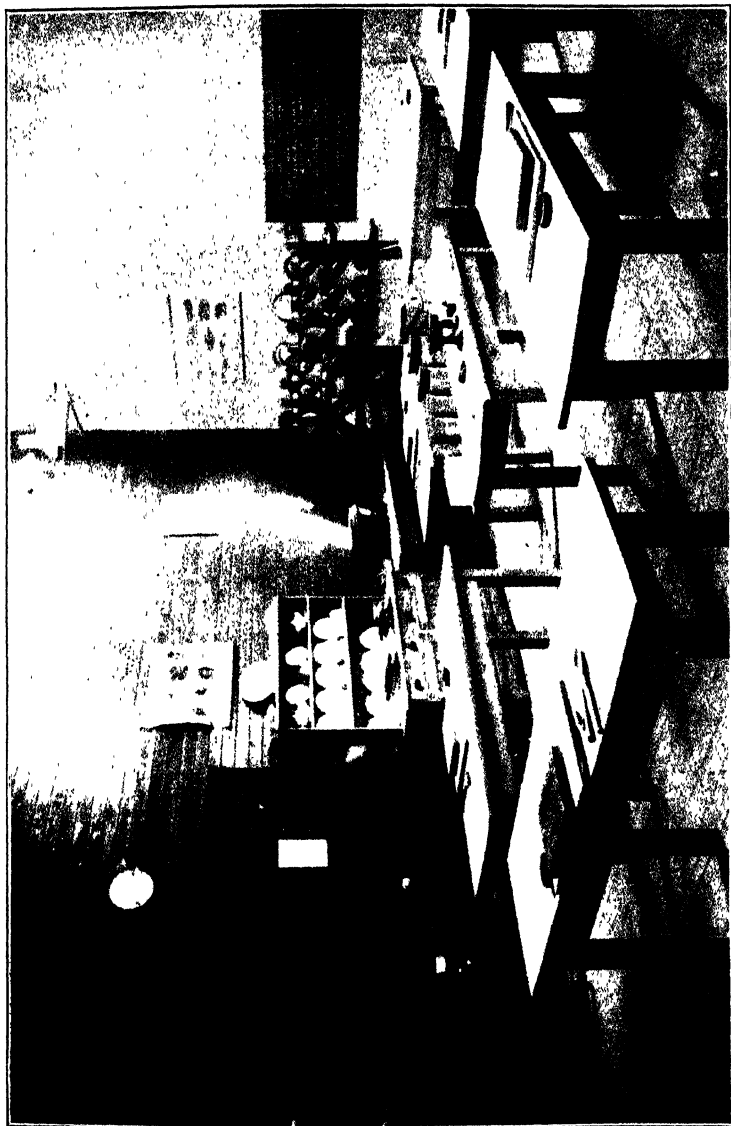


Fig. 6.—Domestic Economy Room.

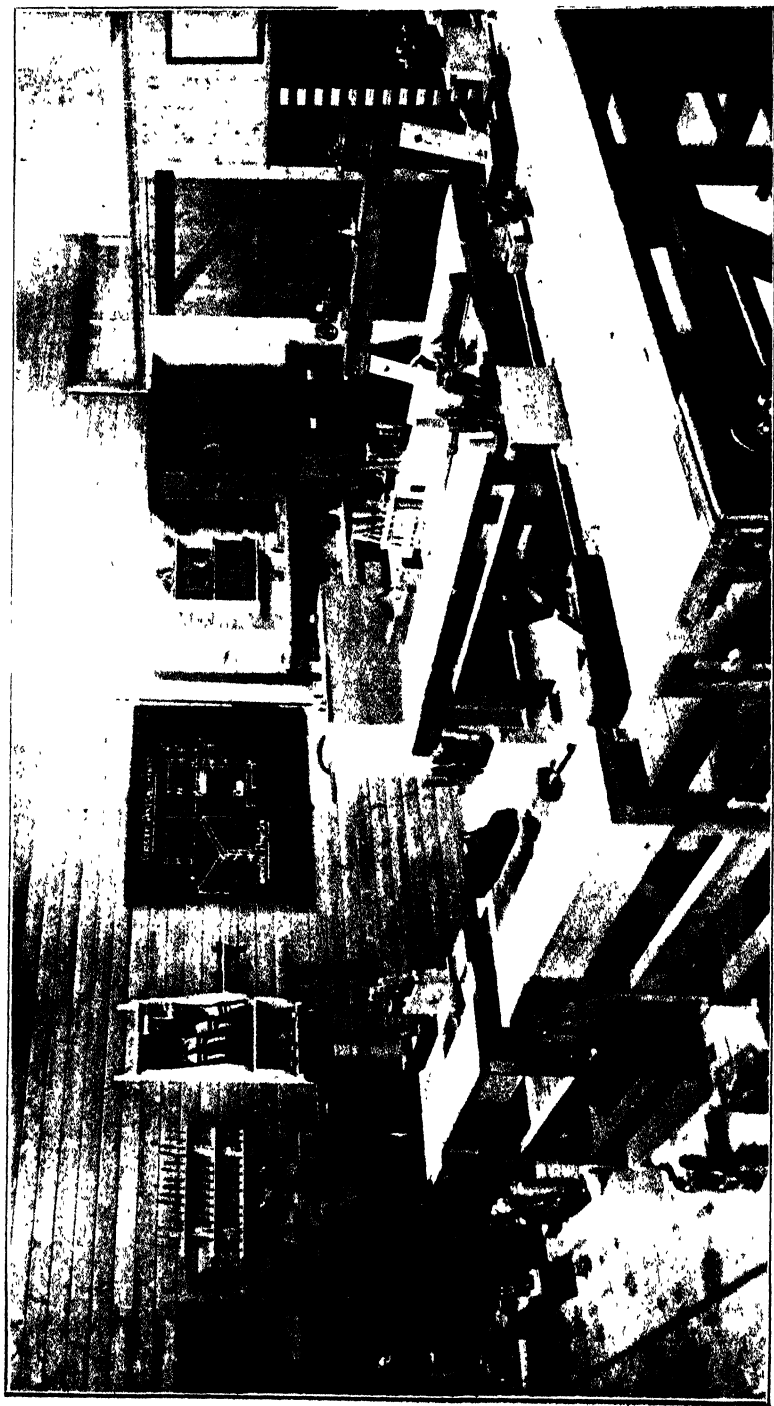


Fig. 7.—Woodwork Room.

The following Tables show the class entries during each year since the establishment of the School. The total number of attendance hours are also given :—

Sections	1902-3	1903-4	1904-5	1905-6	1906-7	1907-8	1908-9	1909-10
Preparatory	—	—	—	—	60	93	84	93
Commercial	324	154	164	117	146	229	185	197
Science	42	87	71	51	141	150	117	107
Art	111	101	122	115	104	116	114	111
Handicraft	—	—	—	—	45	106	87	80
Domestic Economy ..	303	133	82	106	112	153	134	160
Total Class Entries ..	780	475	439	389	608	847	721	748
Total Attendance Hrs.	14,765	12,575	13,303	10,700	*56,564	*36,301	*70,269	*86,224

PART III.—THE TEACHING STAFF.

The Teaching Staff consists of the following whole time officers and sessional teachers, as follows :—

Whole Time Officers.

1. THE PRINCIPAL.

Responsible for the organization of the Technical and Day Trades Preparatory Schools, and teaching Science, Mathematics and Mechanical Engineering.

2. BUILDING TRADES TEACHER.

Teaching Building Construction, Geometry, Carpentry and Joinery and Manual Work.

3. COMMERCIAL TEACHER.

Teaching Business Methods, Book-keeping, Shorthand and Typewriting, Economics and Banking.

4. ART TEACHER.

Usual Art subjects.

5. DOMESTIC ECONOMY INSTRUCTRESS.

Teaching Cookery, Laundry, Dressmaking, Home Nursing, Physiology and Hygiene.

6. LACE TEACHER.

Teaching in Lace School.

Sessional Teachers.

1. ROAD CARRIAGE BUILDING.

2. IRISH LANGUAGE.

* These abnormally large attendance hours are due to the Day Trades Preparatory School and the Lace School.

It is intended to add to this staff a Pupil Teacher in the Science Section of the Day Trades Preparatory School, and a part time assistant in the Commercial Section of the Technical School.

The Principal, Building Trades Teacher, Commercial Teacher, and the Art Teacher are engaged upon the work of the Day Trades Preparatory School as well as upon the work of the Evening Technical School.

THE SCHOOL BUILDING.

An understanding of the School premises can best be obtained from the accompanying plans, which show on the first floor :—

				Accommodation for	
				Classes of	
Art Room .. ..	..	..	..	35	students
Domestic Economy Room	..	..	..	24	„
Experimental {Chemistry	..	..	..	12	„
Laboratory {Mechanics	..	..	..	14	„
Woodwork Room .. ..	..	..	..	16	„
Stores.					
Cloak Room.					
On the ground floor :—					
Commercial Room .. ..	..	..	..	30	„
Building Trades Room	..	..	..	16	„
Engineering Workshop	..	..	..	16	„
Forge .. ..	..	..	..
Engine Room.					
Cloak Room.					
Principal's Office.					
Library.					
Reading Room.					

The two latter are under the control of the Library Committee.

The rooms on the ground floor are all 12 feet high, whilst those on the first floor are 20 feet high.

It is desirable, but not urgent, that the ceiling of the ground floor should be raised so as to distribute the height more evenly.

The front staircase is of stone, whilst the back staircase, which has recently been erected, is of pitch pine. The School is very solidly built of stone. Undoubtedly the acquisition of this old Mechanics Institute has been an immense advantage to the work of Technical Instruction in Clonmel. There is a space at the back of the School 50 feet by 50 feet, which, in the event of a local industry justifying the expenditure, could be built over for the further extension of the School, and, as before indicated, the borrowing powers of the Committee would enable such an extension to be carried out without unduly taxing the Committee's finances.

TECHNICAL SCHOOL, CLONMEL.



Fig. 8.—Metal Workshop.

WORK OF STUDENTS IN THE
MECHANICAL ENGINEERING COURSE
at
COLUMBIA TECHNICAL SCHOOL



EXPERIMENTAL ENGINE AND BOILER MADE
BY STUDENTS
STEAM PRESSURE 30 LBS. 8500 REVS. PER MIN.

OIL ENGINE MADE
BY THE STUDENTS

Fig. 9.—Examples of Practical Work.

One of the most promising features of the work of Technical Instruction in Ireland is, that from the first
Some Results people have asked to be shown "results."

The educationist knows that the full results of any branch of education cannot be realised until many years have passed—that the effect must grow with the growth of the individual who has received that education ; also that the community can receive benefit only through the individual.

Much of the effect upon the community inevitably is lost by the removal of old students from the town.

It would be easy to record numbers of cases where individuals have received benefit from the scheme of instruction in Clonmel ; this benefit taking the form of increased knowledge and capacity, resulting in material advancement ; appointments being obtained which would otherwise have been unattainable, and work being done which otherwise could not have been attempted.

In this connection it is encouraging to note that many employers in Clonmel now turn naturally to the Technical or Day Trades Preparatory Schools when seeking young people to fill positions in offices, workshops and salerooms. This tendency has been particularly noticeable of late.

It would also be easy to point to the work of the Lace School, which has enabled numbers of girls, who through physical disabilities or otherwise are precluded from more active occupations, to earn their support.

But in Clonmel it is possible already to go further and show the results accruing to the community on a considerable scale in respect of the road carriage building trade. The results in this instance have come with exceptional rapidity.

The employment in single workshops now equals the total employment in the town eight years ago, and thousands of pounds are brought into the town every year by means of this revival of the coach-building trade.

This represents solid gain, not only to Clonmel, but to the country ; for the type of car now manufactured is of a high class, such as was being imported to a considerable extent.

It should be clearly understood that this result has been achieved only by the Instruction which the School provided, being backed by character on the part of those engaged in the trade.

It needs no flight of imagination to see this particular industry extending its ramifications and taking in other somewhat allied trades, for which the position of Clonmel is admirably suited. The Technical and Day Trades Preparatory Schools are ready to co-operate to the fullest extent with such a development.

There are other trades still lingering, or almost dead, in the

locality, which could be revived upon the same basis as the above example, viz., the instruction must be specialised and very practical, and must meet with character on the business side.

It has taken over eight years to gradually build up the present institution, exercising always such economy that

Conclusion no reserve force should be wasted. Possibly this economy has sometimes hindered the fullest value being obtained from classes, but the end will justify the policy.

The town now possesses a School capable of doing excellent work. Experience and stability have been gained. It has been demonstrated that great good can be realised to the individual and to the community.

Now it is possible to look straight into a future when thorough methods and satisfactory equipments will attract much larger numbers of pupils, and do a greatly extended good to the community.

The Census returns, which are just to hand, show that at last there is a check on the decline of the town. (The increase in the previous Census was due to the extension of the borough boundary.) It is a good omen, and although the population of the surrounding country again shows a decrease, it is probable that this has not occurred during the later half of the decade.

The improved prospects of agriculture warrant the assumption that once again the country will be properly cultivated and will support a good population.

Whilst meeting the needs of the immediate present, it is the aim of the Scheme of Technical Instruction in Clonmel to prepare the town to participate in the prosperity which will inevitably come to the country in the future.

WEEDS.

All undesirable or obnoxious plants, wherever they may be found growing, whether actually amongst crops, along hedges and ditches, in waste or other places, may be classed as weeds. The harmfulness of weeds does not lie merely in their own individual uselessness from the farmer's point of view, but far more in the fact that when present among crops they occupy space, absorb food-making materials and water from the soil, and obtain sunlight and air at the expense of those plants which are under cultivation, they are, in fact, nothing less than robbers and intruders. Further than this, some of them, such as thistles and docks, cause unnecessary trouble and expense in harvesting crops like those of cereals and flax, while others may harbour and conserve insects and fungoid pests. The chief objection to their presence in waste places, etc., is the very serious one that such places are the chief sources from which the supply of weeds (by means of seeds, etc.) is derived, although they may also come from seeds spread with farmyard manure or sown with inferior and impure seeds of grasses, clovers, etc. (See Department's Leaflet No. 59, "The Testing of Farm Seeds.")

Although all weeds are to be regarded as highly objectionable, yet certain of them are usually regarded as more noxious than others, and these are frequently plants, which, owing to natural adaptations favouring them in the struggle for existence, are most difficult to keep in check or to eradicate. Some of them, such as Charlock (or Preshaugh) if left alone, produce very large quantities of seed, much of which remains dormant in the soil for many years. Others possess perennial organs by means of which they not only persist, but spread more and more widely. Others, again, produce seeds which are easily borne away on the wind to settle in and contaminate other areas of land.

To cope successfully with many of these weeds united action on the part of all concerned is necessary, for it is useless for one man to rid his land of weeds if it is exposed to the risk of recontamination from those present on that of a less up-to-date neighbour. It was with a view to promoting such concerted action in Ireland that the "Weeds and Agricultural Seeds (Ireland) Act, 1909," was promoted and passed by Parliament. Under this Act the Department have power, with the consent of the County Council, of declaring that throughout the county concerned certain plants are to be classed as noxious weeds. Where they are satisfied that any or all of these noxious weeds are to be found growing on

land in that county, the Department have power to serve notice upon the occupier of the land requiring the weeds to be cut or destroyed in a manner specified by them in the notice and within a given time. Failure to comply with the requirements of the notice constitutes an offence under the Act, and renders him liable on summary conviction to a penalty not exceeding, for the first offence, five pounds, and for the second or any subsequent offence, ten pounds.

The following are the names of the plants, any or all of which may be scheduled as noxious weeds :—Ragweed, Charlock, Coltsfoot, Thistle and Dock. The methods for dealing with Charlock have already been dealt with in Leaflet No. 6 ("Charlock (or Preshaugh) Spraying") and the present article deals with the other weeds in this list.

RAGWEED.

There are altogether some six species of Ragweed found growing in Ireland and known under such various names as Ragwort, Benweed, Bookalawn bwée, Bulkishawn, etc. The two commonest, however, are the common Ragweed of dryish pastures and meadows, and the Marsh Ragweed of damp and boggy ground.

The common Ragweed is a perennial plant which owes its name to the fact that its leaves are much cut up or indented, and hence the whole plant presents a more or less ragged appearance. The leaves are at first more or less closely pressed against the ground and arranged in a radiating manner so that a small compact rosette is formed. From the centre of this a leafy stem grows up, reaches a height of a couple of feet or more, branches chiefly near the top, and bears a large number of flower-heads resembling small daisies, the flowers themselves being of a fine golden yellow colour. Each flower produces a single one-seeded fruit bearing a tuft of hairs at its apex, by means of which it is easily dispersed by the wind, this being the mode by which this weed is spread from place to place. The Marsh Ragweed and the other species are very similar in appearance to the common Ragweed, and hence do not require separate descriptions.

The easiest means of getting rid of Ragweed is to stock infested land with sheep in spring and early summer. These animals are extremely fond of this plant, and will soon "eat its heart out." Failing this it can be eradicated by systematically cutting or pulling the plants, which should be done either before they flower or just when they are in flower, so that the possibility of seeds being produced is excluded. Pulling the plants can best be done when the land is damp.

COLTSFOOT.

This plant, known also as Ahinn, Spoonk, Spunk-leaf, etc., grows naturally in arable land on rather heavy, damp, clayey soils, and is also frequently found in abundance on the waste land bordering railways and roads, whence its hair-crowned seeds are easily conveyed by the wind to neighbouring lands.

The plant is a perennial one, and in February and March sends above ground its flower-heads, some time before the leaves appear. The former, to a casual observer, resemble those of the common Dandelion, but in reality they differ in several respects. Thus the colour of the flowers of Coltsfoot is a paler yellow, and the flowering heads are smaller than in the Dandelion; the flower-heads of Coltsfoot are drooping or nodding when in the bud, whereas in the Dandelion they are erect; the stalks bearing the flower-heads in Coltsfoot are clothed with numerous scale-like leaf structures, while these are quite absent in the Dandelion. After flowering each flower-head (which contains a large number of individual flowers) develops into a round fluffy ball like that of the Dandelion, consisting of a convex whitish disc carrying a number of one-seeded fruits, each bearing at its apex a tuft of hairs, which, however, are not carried on a slender stalk as is the case with the Dandelion. These are the so-called seeds, and as stated above they are easily conveyed far and wide by the wind.

When the flowering stage is nearly over the green leaves make their appearance, coming up from below ground. At first they are covered on both surfaces with a whitish web of cottony hairs, and this gradually disappears from the upper surface as the leaves grow older but remains covering the lower surface. These green leaves which are stalked, and may be four or five inches broad, are angular and toothed, and in them food is manufactured and sent below to be stored in the underground organs of the plant. The whole of the stem of the plant lives below ground, and serves by its creeping habit to increase the area it occupies. It contains large stores of food, and is provided with buds from which the flower-heads and leaves are developed. When land on which this weed is prevalent is being tilled these underground stems are apt to be broken into pieces and these to be scattered over the land. By this means the plant is spread, for each piece of stem is capable of producing a new plant.

Coltsfoot is a weed which it is extremely difficult to get rid of. Pulling or cutting the flowering stalks in the early spring will, of course, prevent its further propagation by seed; and systematic destruction of the leaves will, as in the case of the creeping thistle, both exhaust the store of reserve food, and at the same time prevent

fresh supplies from being formed, and this method of treatment will be quite practicable amongst root crops by the use of the hoe. Care should be taken to gather up and destroy by burning the fragments of the underground stems which result from ploughing and other tillage operations.

In poor pastures, where it sometimes occurs, its growth can be successfully checked by the use of nitrogenous manures, such as farmyard manure, nitrate of soda, and sulphate of ammonia, and since the plant has a preference for damp land, drainage is often successful in combating it.

THISTLES.

Nine different kinds of Thistles are to be found in Ireland, all of which are to be regarded as noxious weeds, but only three of these kinds are really abundant and widely distributed. These are (1) the Creeping Thistle, (2) the Spear or Horse Thistle (sometimes erroneously called the Scotch Thistle), and (3) the Marsh Plume Thistle, and they constitute in the main the bulk of the thistles with which the farmer has ordinarily to deal.

The Creeping Thistle, which is the commonest and most abundant of all thistles, is a perennial plant, the overground parts of which die down at the end of each season, so that its living parts are not in evidence during the winter. The perennial or persistent part of

The Creeping Thistle

the plant is its underground root-system, from which a fresh crop of stalks arises each spring, and a single thistle plant thus possesses in reality a large number of such stalks, although each separate one is commonly but wrongly regarded as being an individual thistle plant. These stalks are derived from buds formed during the previous season on fleshy roots which contain a quantity of reserve food. The roots branch frequently and creep in all directions in a more or less horizontal fashion at a depth of some inches below the surface of the soil, so that a considerable and ever-increasing area becomes occupied. In addition to this many of them penetrate very deeply into the soil, cases being known where they have attained a depth of six feet and more.

The young shoots which arise from the buds as stated, have first to penetrate upwards through a layer of soil, some six to eight inches thick, as a rule, before reaching light and air. The lower, underground portions of these shoots are provided with rudimentary leaves, in the axils of which more buds are produced. They also possess a good supply of special roots of their own, not so thick as the creeping, perennial roots, which serve as a ready means for supplying the rapidly growing shoot with water and food-making.

materials. When these shoots appear above ground they continue their growth upwards, producing prickly leaves which also point more or less obliquely upwards at first and do not lie flat on the surface of the ground, forming a rosette of leaves, as in the case with the Spear and Marsh Thistles. The stems themselves are not usually prickly, but as a rule the prickly edges of the leaves are continued as an outgrowth down them for some distance below the points of insertion of the latter.

As the season advances the stalks, which contain a certain amount of milky juice in their upper portions, become branched and develop their flower-heads. These are of comparatively small size, and the individual flowers composing them are of a pale lilac or lavender colour, and possess an attractive, sweet odour. From the flowers the fruits are developed, each one being provided with an apical tuft of white down which enables it to be carried away by the wind. These fruits, each of which contains but a single seed, constitute what are commonly known as thistle seeds. The number of such seeds produced in a single head varies considerably, for some of the flower-heads bear male flowers only and consequently produce none, and in others the numbers are often reduced by the attacks of insect larvæ. Nevertheless, it is quite a mistake to suppose that this thistle produces no seeds, and depends for its propagation upon its roots alone.

The seeds germinate quickly under suitable conditions of warmth and moisture, and during the first year a long tap-root is produced by the seedling on which thin lateral roots arise, as well as buds. Branches from this tap-root are also formed which radiate from it in a more or less horizontal direction for a short distance and then abruptly bend and descend deeply into the soil. Thus the young plant becomes firmly established during its first season, and resumes and extends its growth and development during the second and succeeding ones.

Any successful attempt to eradicate this thistle must be based upon a correct knowledge of its own mode of life, and not on that of other kinds of thistles, as has often been done. When the stalks of this thistle are cut off at or near the ground level, some of the buds present on the underground portions of these stalks grow up into new stalks. If the stalks be *pulled* so that their underground portions are also removed, the buds present on the persistent roots are stimulated to grow up and form fresh shoots. This production of new shoots to replace those removed can only be accomplished at the expense of the reserve food in the roots. If the second lot of shoots be cut or pulled a third lot will develop, also at the expense of this store of food. By persistent removal, therefore, of the shoots, this store will become so exhausted that the

plant will ultimately have nothing left from which new shoots can be developed.

The food stored up in the roots is actually manufactured only in the green portions of the plant above ground, and descends from above just as in the case with the Potato. By repeated removal of the shoots, therefore, as they appear, not only is the store food in the plant gradually exhausted, but the possibility of the manufacture of a fresh supply is precluded. It is also obvious that persistent cutting prevents the formation of seed, and thus prevents the plant from propagating itself by this means.

To combat this weed with success, therefore, cutting or pulling must be resorted to, and persisted in *early and often, early* to prevent the manufacture of fresh food supplies from taking place, and *often* to exhaust those already in the plant. Experiments have proved that three cuttings per annum consistently carried out for three successive seasons results in the extermination of the plant. The first cutting must be made when the shoots are not more than four to six inches in height, usually early in June; the second after an interval of three or four weeks (July); and the third after a further similar period has elapsed (August). It is the greatest possible mistake to postpone the cutting of this thistle until it has reached the flowering stage, for by that time it will have accumulated sufficient extra supplies of food to withstand to a very great degree the exhausting effect of cutting.

When this thistle occurs in arable land it is often possible to pull it, and this process is more effective than cutting. The plants, therefore, should be pulled, or cut if this is not possible, as early in the season as possible, and this process should be repeated as frequently as it can be done. Portions of the roots of the plants exposed during the operations of tillage should be gathered up and burned, for if left lying about each of them may produce a new thistle plant.

The Spear Thistle and the Marsh Plume Thistle differ essentially in their mode of life from the Creeping Thistle. As its name indicates the Marsh Plume Thistle is found only on rather damp, marshy or peaty land, while the Spear Thistle is found in much drier situations. These plants are not perennials but only biennials, that is their full development is completed in two seasons. The seed germinates in the late summer or autumn, and from it a plant develops which possesses a number of prickly green leaves arranged in the form of a rosette and closely pressed down against the ground. The dark green or reddish leaves of the Marsh Plume Thistle are more divided, and possess more prickles than those of the Spear Thistle, the leaves of which are larger,

The Spear and Marsh Thistles

lighter green and furnished with fewer but stouter prickles. These two thistles pass the winter in this visible "rosette" form, while the Creeping Thistle, as stated above, possesses no overground parts during this period. In the spring the rosettes become enlarged owing to growth and the production of new leaves, and after a certain time has elapsed the centre of the rosette grows up into one or more tall prickly branched stems bearing leaves and flower-heads. The flowers are purplish or magenta in colour, and in the case of the March Plume Thistle not infrequently white. The flower-heads of the Spear Thistle are larger and rounder, and those of the March Plume Thistle smaller than those of the Creeping Thistle. When the seeds, each of which bears a tuft of down, have been produced the individual plants in the case of these two thistles have reached the limit of their existence and die off. The eradication of these two weeds is easier than that of the Creeping Thistle. They should first be attacked by spudding when they are in the rosette stage. Each rosette should be thoroughly spudded out and turned over to see that the roots have been entirely cut through at a distance of one or two inches below the soil. If this be done there is little fear of further development from these individuals. Any plants which have been accidentally passed over during the spudding process must be cut when coming into flower, and before the seeds have been produced. If spudding be found to be impracticable the thistles should be allowed to grow until they reach the flowering stage, when one cutting, as low down and near the surface of the ground as possible, will exterminate them and prevent the formation of seeds. This method of procedure it will be seen is essentially different from that necessary for the Creeping Thistle for on no account must Creeping Thistles be allowed to reach the flowering stage, and at least three cuttings of them must be made during the season.

Docks.

Of the seven species of Docks growing in this country the most prevalent as farm weeds are the Curled Dock, the Broad-leaved Dock and the Clustered Dock. These plants are also known as Dockens or Cuppogue. The differences between them are, from the farmer's point of view, quite unimportant and will not be discussed here, and the plants themselves are so well known that a brief general description will suffice.

Docks are perennial plants, and possess strong, deeply penetrating, thick tap roots, which contain large stores of food material. They produce tall stems, generally of a reddish colour, bearing large leaves and large numbers of inconspicuous reddish-green flowers from which the triangular, shiny, chestnut coloured seeds (one-

seeded fruits) are derived. When the stems are cut, fresh ones grow from buds formed at the tops of the thick roots. When pulled, full grown plants are very tenacious of life, and even when left exposed and lying on the ground may ripen their seeds. Hence old plants which are removed during ploughing, etc., should be collected and burned, and not left to lie about in odd corners where they may continue their growth. Seedling Docks, however, are more sensitive, and when left exposed, as is done by hoeing amongst root crops, soon die. If hoeing be continued amongst such crops as late as possible, or even into the autumn, many young plants will thus be destroyed, which if left alone till the next season would become well established and much more difficult of eradication.

In grass land Docks should be systematically spudded or docked with a special tool (the "Docking Iron") as frequently as possible, preferably when the land is damp, every effort being made to prevent them from reaching the flowering and seeding stage. Since the seeds of Docks are frequent as impurities in samples of clover and grass seeds, care should be taken to purchase such seeds of the highest grade only, from which Dock seeds are absent or practically so. This is specially important as seeds of high class quality are by far the most economical for the farmer to use.

Copies of this article in leaflet form (No. 97) may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin. Letters of application so addressed need not be stamped.

THE CULTIVATION OF POTATOES IN HOLLAND.

The Department of Agriculture at the Hague has issued an important Report on Potato Growing in Holland.* From it the following particulars have been extracted.

[In Holland the area under potatoes is a very large one and is second only to that occupied by the rye crop; indeed, no less than 18·4 per cent. of all the cultivated land in Holland is devoted to raising potatoes. The potato growing industry has greatly increased during the past 60 years, for in 1851-60 the potato crop only covered 13·8 per cent. of the total arable land. The increase has been particularly remarkable in the provinces, where the moors are being reclaimed and colonies planted. In Groningen, for example, the area has more than doubled since 1870, and in Drenthe it has even doubled since 1880.

The report contains an interesting map showing the present distribution of potato culture over the whole country.

Distribution of Potato crop From this it appears that the various regions may be arranged in three categories :—

(1) Districts where potatoes are the staple crop. These include the three north-eastern Provinces—Groningen, Drenthe and Overijssel—where potatoes are grown primarily for manufacturing purposes. Here from one-quarter to one-half the cultivated land is planted in potatoes, and local agriculture practically stand or falls by that crop.

(2) Districts where the area under potatoes occupies from 5 to 15 per cent. of the total area of grass and arable land. These include the sandy regions in general, the clayey regions of central and southern Holland, and the islands of Zealand. The importance of the crop varies, however, very much within these limits.

(3) Districts where the potato crop is of but small to very small importance. These comprise the clayey regions of Groningen, and also districts where meadow land predominates; for example, in South Holland, and in the great dairying province, Friesland.

It is interesting to note that the potato crop is, on the whole, much more important to small than to large holdings. The crop rotation in many large farms (including those established on reclaimed bogs) regularly includes potatoes, but in the greater part of the

* Departement van Landbouw, Nijverheid en Handel; Verslagen en Mededeelingen van de Directie van den Landbouw, 1910, No. 3.

country the area devoted to potatoes is just as large on the small farms as on the large ones, so that the importance of this crop to the small holder is relatively much greater. Potatoes, too, are the staple crop of the labourer who owns a plot of ground. This is true not only of the man who rents land simply in order to provide food for his family (as is done nearly everywhere in Holland), but also of those who buy or rent land in order to sell a portion of its produce. In some districts this latter class of holder has been greatly on the increase of late years. Many large holdings are being split up into small ones, or large farmers are letting out part of their land in separate lots. The tenants of such lots are mostly labourers or artisans, and the crops they cultivate are chiefly potatoes or sugar beet. These crops are selected because they both require a good deal of hand-labour, and the owners in this case do not set a very high value on the time which they devote to tending their crops. From the map, too, it is possible to get a rough idea of the districts where the production of potatoes exceeds the consumption, and *vice versa*; but in order to obtain an accurate estimate of the yield per acre, the object for which the crop is intended and the density of the population must also be taken into account.

A table is given showing the total yield of potatoes per acre for the different provinces during the past sixty years. The figures show that the yield per acre has greatly increased in every province during that period, and if we compare the all-round yield for the periods 1871-1888 and 1901-1908 we find that it rose almost 65 per cent.

Potatoes grown for industrial purposes are known as "factory potatoes," and are chiefly raised in Groningen, Drenthe, Friesland and Overijssel, as well as in other places close to the centre of the potato-flour industry. Although this class of potato has been grown for many years in Holland, it was not until about 1860 that the industry was taken up on a large scale. Special statistics of this crop are, however, only available since 1898, but these show a steady increase in the area devoted to it. About three-fifths of the total output of factory potatoes come from Groningen. In Friesland this branch of potato growing appears to be on the decline, but it is extending in both Drenthe and Overijssel.

The report states that it is impossible to draw any sharp dividing line between early and late potatoes, because the harvest time of the early varieties merges into that of the medium earlies, and so into that of the late varieties. Moreover, the early potato industry is not confined to market gardens, nor yet to land where garden crops are usually planted, and also some varieties are grown

indifferently as an early or as a late crop. Nevertheless, there are certain districts which are specially given up to the cultivation of early potatoes, where early varieties are planted, and where the harvest is hastened as much as possible by sprouting of the tubers, by heavy manuring, by protection from night frosts, and by digging the crop before the potatoes are fully grown in order to realise higher prices. The heavier crop, better quality and greater keeping power which may be attained in the case of late varieties are, of course, thereby sacrificed. The total area under early potatoes in 1904 was estimated at something over 10,750 acres.

Potatoes are grown in Holland for four principal purposes :—

- | | |
|-----------------------|--|
| | (1) The household use of the grower. |
| Purposes for | (2) Sale as table potatoes. |
| which Potatoes | (3) Preparation of starch and allied products, |
| are grown | and |
| | (4) Live stock feeding. |

It is impossible to determine exactly the quantity sold for table use, consumed by the growers themselves, fed to live stock, lost through decay or used for seed. The following estimate was made in 1905 of the proportion of the total potato consumption in Germany devoted to various purposes :—

Human food	..	..	28 per cent.
Preparation of spirit	..	..	6 „
Preparation of starch	..	..	3 „
Cattle feeding	..	..	41 „
Seed	..	..	12 „
Waste, decay, etc.	..	..	10 „

By this it would appear that the quantity of potatoes consumed by live stock in Germany is nearly 50 per cent. more than that consumed by human beings. In Holland the quantity of potatoes used for stock feeding is much less than that. Potatoes are specially grown for the purpose only in a few sandy districts, such as Gelderland and Overijssel, where they are chiefly fed to pigs. The reason assigned for this is that in Holland other fodder crops can be more advantageously grown than in Germany, where there are import duties on feeding stuffs. In most places in Holland only unsaleable potatoes are fed to the cattle. In Holland, too, practically no potatoes are used for making spirit.

Details of the cultural methods followed in each province are given in the various sections of the report. These methods naturally vary somewhat in different districts, but in general it may be said that the care devoted to the potato plant is proportionally greater as the area devoted to that crop increases. On the clay

of West Friesland where potato growing approaches more to horticulture, and also in the bog colonies and various other places where potatoes are one of the leading crops, far more labour and capital are bestowed upon them than where they are regarded as a merely secondary crop, or are only grown for household consumption.

The fact that good manure and care are essential to the potato is demonstrated by the large sums expended on manures, labour, etc., in the great potato districts of Holland. For example, in the arable part of Friesland potatoes are grown in stable manure, applied at the rate of from 20 to 35 tons per acre, often with a dressing of 4 cwts. to 6 cwts. of ammoniated phosphate per acre in addition.

In the bog colonies factory potatoes are dressed year after year with artificial manures costing up to £4 per acre.

The practice of sprouting seed potatoes before planting, with a view to making the plants come up evenly, is followed, not only by growers of early potatoes, but also by some growers of late varieties, especially in Friesland. Much care is bestowed there on the storage of the seed tubers, and some of the big growers have built special storage cellars for the purpose.

As regards spraying with Bordeaux mixture, this is still only done on a large scale in relatively few districts.

Spraying Of late years a powder has been very commonly used, consisting of a mixture of sulphate of copper and calcined soda. This, though not better, is easier to handle than the copper sulphate and lime mixture formerly used.

The number of varieties of potatoes planted is amazingly large, and is as a rule greatest in regions where the potato crop is of least importance. The reason
Varieties planted for this is that in places where there is a regular potato market the buyers like to get large quantities of even quality and of the kind to which their customers have grown accustomed. This circumstance is, of course, an obstacle to the introduction of new varieties, a fact to which several sections of the report direct attention.

Accordingly, in most centres of production of table potatoes only a few different varieties are to be found, but, on the other hand, in places where potatoes are only grown for home consumption, the number of sorts is generally very large. Each man plants the kind to which he has always been accustomed, and pays no attention to the demands of the trade. Many varieties with local names are to be met with; these are frequently distinguished for their quality but not for their large yield. Often, too, one and the same variety is known by several different names.

As already stated, it is not easy to introduce new varieties in

districts where potatoes are grown on a large scale. This is often not done until the old variety begins to show signs of declining vigour. Curiously enough, some varieties last much longer than others in a certain district. Thus, *Magnum Bonum* was grown for some years as an export potato on a large scale in Friesland. It is now, however, quite driven out there by the "*Borger Munster*," though it is still cultivated in Limburg and in some places in Germany. The difficulty of introducing new varieties does not apply to factory potatoes. Here one variety is often replaced by another with a heavier yield.

Till a comparatively recent time the seed potatoes were always obtained by sorting out from the gathered crop tubers of a certain size, generally considerably below the average of the crop. Although this method is still the most general, people are beginning to realise more and more (especially under the influence of the Government Experiment Plots) that the most productive tubers are not obtained by this method, and that the decline or "wearing out" of many sorts of potato must be attributed to unsuitable choice of seed. Consequently more care has of late been bestowed upon this matter.

The measures which are now adopted to increase the crop by a correct selection of seed tubers are as follows :—

1. *Change of seed*.—This is a method of old standing. In some places growers confine themselves to obtaining their seed now and then from a neighbour, whilst in others it is regularly procured from a fresh stock or from another district. For example, seed is often brought to a sandy from a clayey district, and as a rule with very good results. It has been shown, moreover, that by proper sorting of one's own seed, the wearing out of a variety which has been grown for a long time on the same ground can be partially or completely prevented.

2. *Introduction of new sorts*.—Although, as already stated, it is not easy to introduce new varieties, still a number of these have been taken into use and are now being grown on a large scale.

3. *Improvement of the stock*.—Of late years the conviction has been gradually growing that the tubers from one variety of potato are by no means all of equal value, and that the latter does not depend primarily upon the size and shape of the tuber, but that the characteristics of the mother-plant and its pedigree play a large part therein. The Government Experiment Plots, for instance, have been particularly helpful in driving this idea home, and growers are beginning to set aside the best plants at the harvest and to use their tubers as seed. Many growers in the bog colonies, Friesland and North Holland, are regularly applying this method and

apparently with encouraging results. This selection of good plants is also practised in some places where leaf curl is prevalent, and care is then taken that no tubers from diseased plants are used.

Only a very limited number of people in Groningen and Friesland are engaged in the work of raising new varieties

Raising new Varieties from seed. A large number of new varieties have been obtained in this way, but only the most

productive of these have been retained, that is to say, those which are most productive on the soil where they were raised. But it does not always follow that the rejected varieties would be equally unproductive in another district, and thus it may happen that very valuable material is thrown away every year. The report therefore urges the necessity of establishing seed raising centres in various parts of the country where potato culture is carried on.

The potatoes which are not consumed in the grower's own household are disposed of in various ways. They may

The Potato trade

be taken by buyers in the neighbourhood, by the great centres of population in Holland, or lastly, they may be exported. Potatoes which are not sent out of the district where they were grown are generally sold direct to the consumer. In the towns, too, many people regularly buy their potatoes straight from the grower.

When the trade is conducted by intermediaries it gives rise to many complaints, and the fact that these complaints are unanimous and come from different parts of the country proves that they arise from certain peculiarities of the potato trade itself. Potatoes do not lend themselves as readily as do other crops to sale in a central market or exchange. Their value per bushel is so small that the grower or the person who brought them to market literally *must* sell them at any price. It would not pay to store them or carry them back to the farm. Moreover, it is extremely difficult to take a sample which shall not be too large and which yet shall be a good average specimen; the buyer, therefore, has to see the whole lot in order to get a true idea of its quality. This is, of course, a great drawback in dealing with bulky goods such as potatoes. Finally, potatoes cannot be stored so easily as grain. A great deal of space is required, and the consequence is that they have to be stored in the field, and so business may be lost.

For one reason or another potatoes are nearly always sold at the grower's house, and this is no doubt the germ of the evils which arise in the trade. Whenever there is a demand for potatoes, people of all sorts go out to buy from the farmer. Should prices go down in the interval between the sale and delivery of the potatoes, then some buyers try by every means to avoid taking delivery.

Again, under similar circumstances exorbitant demands are sometimes made by buyers as to sorting, washing, and above all as to measuring the potatoes.

On the other hand, the dealers complain that farmers try to slip out of their bargains when the market rises. Serious complaints are also sometimes made as to bad grading of potatoes, whereby too many large, small, green or damaged tubers are left in the lot, a circumstance which might have a bad effect upon the reputation of the product. On the other hand, the growers reply that the additional expense entailed by better grading would not be compensated for by the higher price obtained.

The foregoing evils are chiefly encountered in places where there is no regular trade in table potatoes.

Attempts have been made to bring about some improvement. This has been effected for the early and summer potatoes, which are now sold at *Veilingen* or marts, but nothing has yet been done on these lines for the winter potatoes.

In connection with Holland's foreign trade in potatoes, the following points are to be noted :—

1. The export, which in 1891-1903 varied from 7 to 14 thousand wagon loads of 10 tons each per annum, has greatly increased of late years, and in 1908 attained a total of some 28,000 wagons.

2. The import varies from 1 to 7 thousand wagons, without any apparent tendency to rise or fall. The import of Maltese potatoes has greatly increased.

3. The chief customers for Dutch potatoes are Belgium, Great Britain, and Germany. Formerly considerable quantities were sent to Norway, the United States, the West Indies and various other countries. Of those now sent to England some would appear to be re-exported.

4. The export to Belgium which, previous to 1904, was seldom more than 3,000 to 4,000 wagons of 10 tons each, rose last year to 7,000 wagons. It appears that the bulk of the potatoes imported by Belgium are Dutch. In spite of the great quantity which Belgium imports, her export is still greater. Her best customers are Germany, France and England. It should be noted that some of the potatoes sent from Holland to Belgium are consigned *via* Antwerp to England.

5. Germany has of recent years been far and away Holland's best customer for potatoes. In 1908 and 1907 more than one-half of Holland's total export went to Germany.

NATIONAL MUSEUM OF SCIENCE AND ART.

[* * *It is intended to publish, at intervals, in the JOURNAL articles dealing with the work done in the National Museum of Science and Art. The third series of articles is appended.*]

I.—NATURAL HISTORY DIVISION.

IRISH DOMESTIC ANIMALS.

As I stated in the first of the Museum articles,* the ground floor of the Natural History building is now entirely devoted to the collections illustrating the Irish Fauna. One of the cases near the Merrion Square entrance contains a selection of the skulls and bones of our domestic animals, while a larger series of skulls is suspended on the walls. It is to be hoped that those who are interested in tracing the past history of the domestic animals of Ireland will aid in making this collection more complete, by sending to the Museum any bones that may be found in marls or bogs. The series of horse remains from the Crannogs, marls, bogs and caves indicate that the horses that lived in Ireland during the past were all of a small breed, somewhat resembling the still existing Connemara pony.

Of pig skulls there are many from crannogs and bogs, among them several of the ancient so-called greyhound breed, which is now entirely extinct. The skulls of the Irish Wild Boar, as compared with those of the domestic pig, show very clearly the gradual evolution that has taken place. The back of the skull seems to have risen, while the jaws have evidently shortened as a result of domestication.

Of the goat and sheep there are few ancient skulls in the Museum, but sufficient to show that the early races of sheep resembled the goat more nearly than they do at present. Some of the sheep were four-horned.

Most of the cattle remains are from the famous crannog of Dunshaughlin, in the County Meath, described by the late Sir William Wilde. There are also a few bones of cattle from various caves. They all show that Ireland in the past was inhabited by a small breed of cattle resembling the still living Kerry breed.

At the time of the Dunshaughlin crannog period, that is to say in early Christian times, two kinds of dogs seem to have inhabited Ireland. One of these, to judge from the remains contained in the Museum, was like the Irish Terrier, the other resembled the Wolf-

* See JOURNAL, Vol. XI, No. 2, p. 342.

hound, but more material is needed to enable us to trace the past history of dogs in Ireland. The splendid stuffed specimen of Kilkullen, the famous wolfhound belonging to Mr. Pierce O'Mahony, has now been presented by the owner and forms a valuable addition to the collection of domestic animals in the National Museum.

R. F. S.

BIRDS USEFUL TO AGRICULTURE, ETC.

In a previous article* reference was made to the Irish Bird groups exhibited in the Lower Room of the Natural History building, and it was stated that those birds which were generally regarded as useful to Agriculture and Horticulture were placed together on one side of the large central case containing the Herring Gulls.

The four cases containing mounted specimens of 35 Irish Birds, which were specially prepared for exhibition in the Department's Agricultural Section at "Ui Breasail," are now placed as a temporary exhibit, on the walls of the Lower Lobby.

The birds are arranged in four groups.

The first group contains species, which are wholly *innocuous* and even more or less *beneficial* to farmers, fruit growers and gardeners, including: Wrens and Tits, the Swallow, Cuckoo and the Plovers, etc.

The second group includes species which are *occasionally injurious* but with the balance of utility *largely* in their favour, such as the Robin, Linnet, Skylark, Kestrel and the Owls, Gulls, etc.

The third group comprises species which are generally considered injurious in farms and gardens or destructive to game birds, etc., but which on the whole do *more good* than harm, such as the Song Thrush, Greenfinch, Chaffinch, Rook, Magpie and Jackdaw.

The fourth group, containing species which are *destructive* and apparently of little utility, is a very small one and includes the Black-bird, Bullfinch, House Sparrow and Wood-Pigeon.

Descriptive labels giving particulars of the habits and food of the 35 species represented are placed near the specimens.

No analysis of the food of the native birds has ever been attempted in this country, and the particulars given on the labels are largely derived from a pamphlet by Mr. R. Newstead, entitled "The Food of some British Birds," published by the Board of Agriculture and Fisheries, Whitehall Place, London.

This pamphlet is based on numerous post-mortem examinations of the stomach contents and the "pellets" or "castings" of 128 British birds, obtained chiefly in the County of Chester.

The conclusions arrived at by Mr. Newstead might not apply to

* See JOURNAL, Vol. XI., No. 3, p. 512.

birds inhabiting a fruit-growing county like Kent, or a corn-growing county like Suffolk. But an examination of native Irish birds would probably show that their food and habits do not differ greatly from those of similar birds found wild in Cheshire.

A. R. N.

THE HOUSE FLY.

Amongst the recent additions to the insect collections is a fine model of the common House Fly (*Musca domestica*), (Plates I. and II.) enlarged twenty-eight times, in order to show the structure of the various parts of its body. It is proposed to add other models illustrative of the life-history of this ubiquitous insect as soon as they can be prepared.

During the summer months the House Fly is a well-known pest both in temperate and tropical countries, and as it undoubtedly acts as a carrier of disease germs, a knowledge of its life-history is of great importance in combating illness.

The House Fly belongs to the great group of two-winged flies (*Diptera*), an order containing such well-known insects as the Warble Fly, Blow Fly, the destructive Tse-Tse Fly of Tropical Africa, and numerous other insect pests.

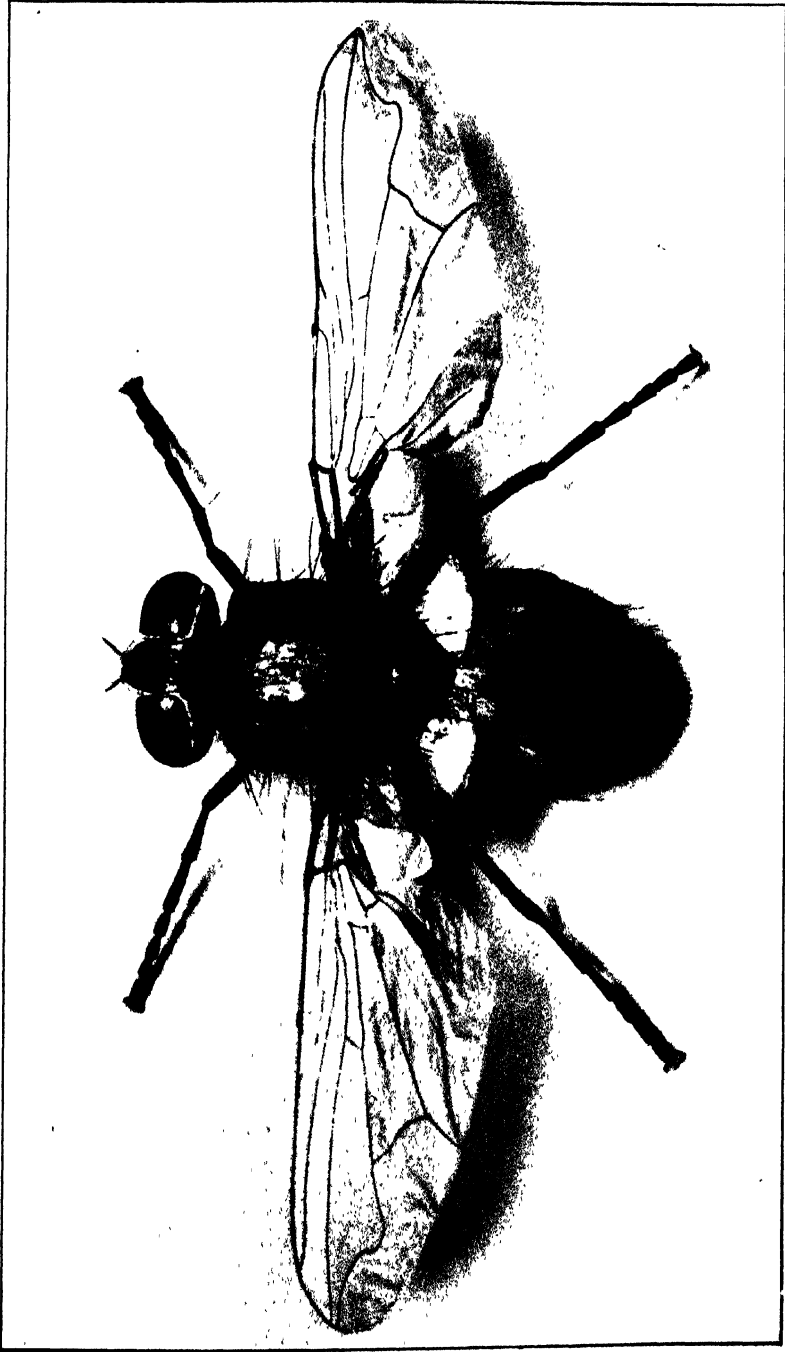
In common with most highly developed insects, the House Fly passes through four well-marked stages during its life-history. These are the egg, maggot, pupa, and the winged fly. The time occupied in this process varies from twelve to about twenty days, according to the nature of its surroundings.

The female fly is known to lay from 120 to 150 eggs at one time, and may deposit as many as 6 batches of eggs during her life, so that under favourable conditions the rate of increase is very high.

The white, footless maggots are hatched from the egg within twenty-four hours, they then rapidly devour the substance on which the eggs were deposited. According to recent investigations this appears as a rule to be horse-manure, though refuse of various kind is made use of by the female fly for this purpose. The rate of growth during the maggot stage depends on such conditions as temperature, moisture, fermentation, etc., of the food supply—a high temperature favouring a more rapid development. The maggots usually reach their full size in six or seven days.

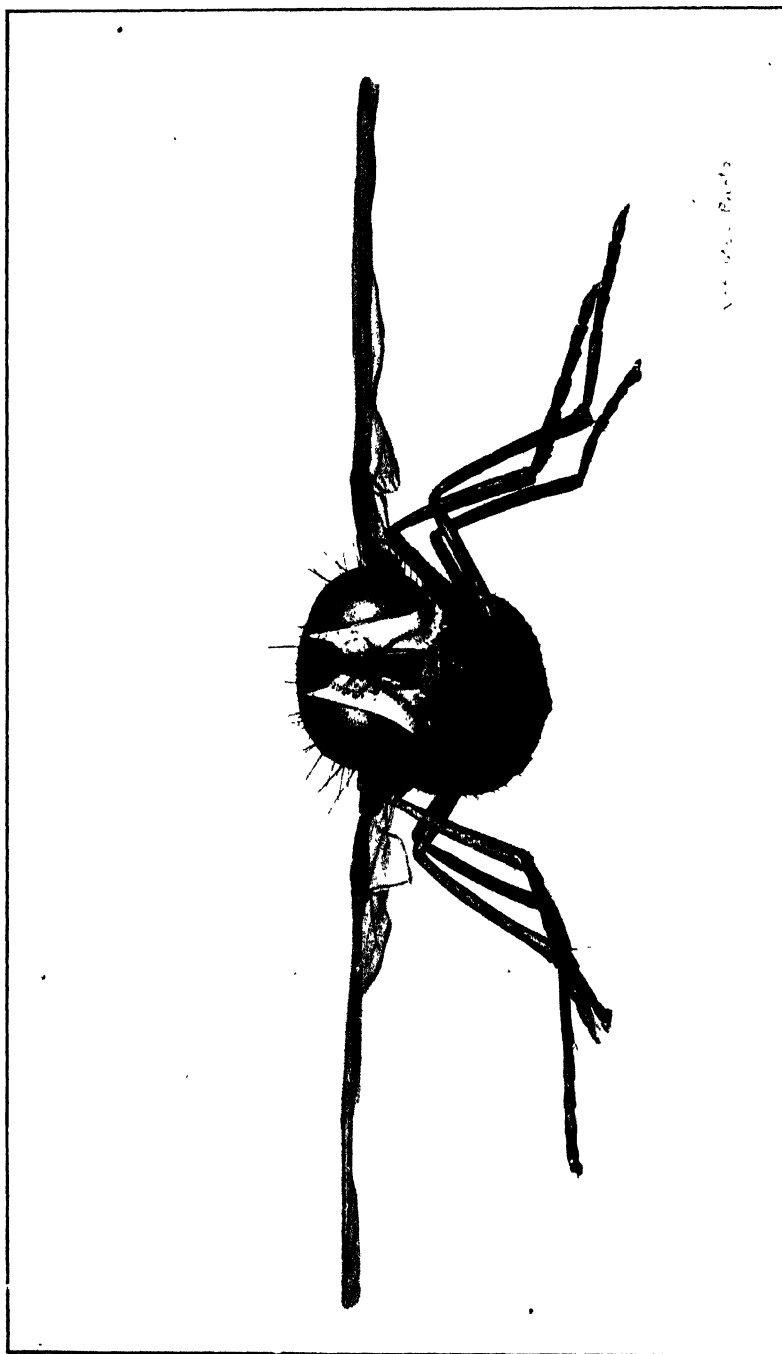
When it is full-fed the maggot contracts and changes into the inert brown "puparium," within which the fly develops in from four to five days. At the end of this time the fly escapes by pushing off one end of this puparium.

It is during the winged state that the House Fly is instrumental in the spreading of disease germs. It has been proved that innumerable disease bacilli become attached to the legs of the fly when it crawls on infected surfaces, and it may thus carry them to human



Model of House Fly—Dorsal View.

PLATE II.



Model of House Fly—Front View.

food, causing epidemics of typhoid, cholera, anthrax, and other serious illnesses.

From the evidence supplied by the Army medical experts, it is clear that much of the mortality occasioned during the Spanish-American and Boer Wars was caused through flies carrying the germs of typhoid to the mess-tents. In cases where the entrances to the mess-tents were protected by netting typhoid was less frequent.

In order to prevent this kind of infection, food of all kind, more especially milk, should not be left accessible to flies during the hot summer months. Refuse heaps, ash-pits and other sources of infection that are likely to supply suitable environments for the maggots, should be disinfected periodically with chloride of lime.

The House Fly appears to have followed man over a great part of the inhabited globe, and it is consequently one of the commonest and most widely distributed species of the insect world.

J. N. H.

FRESH-WATER SPONGES.

The fresh-water sponges of Ireland form an interesting group, and as up to recent years they have been looked for in but few localities, special efforts are being made to obtain specimens from as many parts of Ireland as possible to add to the Museum Collection.

Only about half a dozen kinds of fresh-water sponges have been found in Ireland, and further search would extend our knowledge of their distribution, and would probably result in the discovery of other species new to this country.

A number of fresh-water sponges from the United States and Canada have recently been acquired and form a valuable addition to the collection of sponges in the Museum. They are especially interesting in view of the fact that several species of fresh-water sponges are common to the lakes and rivers of the West of Ireland and of North America. One of the species, *Heteromeyenia Ryderi*, appears to be widely distributed throughout the West of Ireland, and is one of the commonest fresh-water sponges in some districts.

FRESH-WATER EELS.

A series of specimens of the fresh-water eel has been transferred from the Fisheries Branch, Department of Agriculture and Technical Instruction for Ireland, and now forms an interesting exhibit among the Irish fishes. These specimens illustrate the life-history of the eel, which was unknown until recent years. The series shows the transparent ribbon-like "Glass-eel" which is hatched out in the depths of the ocean off the S.W. coast of Ireland, and the form the eel assumes as it nears the coast of Ireland and prepares to ascend the rivers.

Specimens of the "Glass-eel" stage of the Conger are also shown.

J. S.

II.—BOTANICAL DIVISION.

ROOM III.—HERBARIUM.

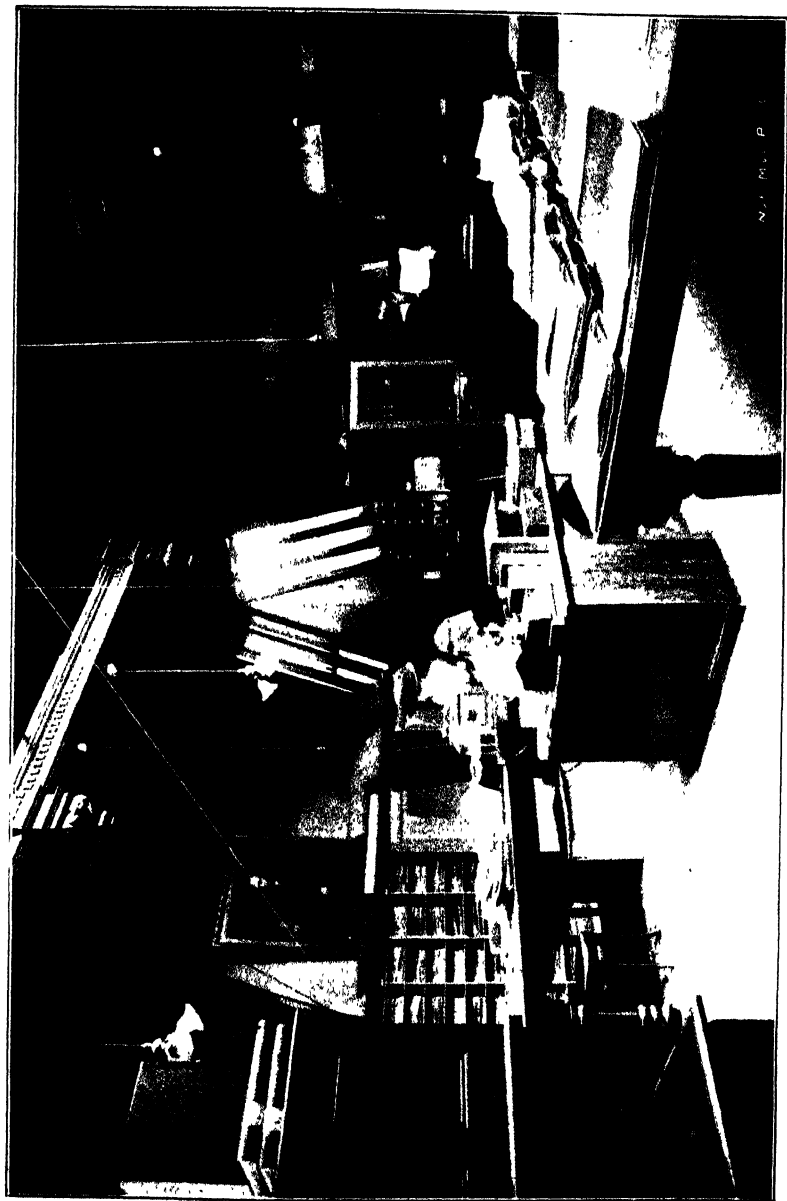
The removal of the Cryptogams (Mosses, Liverworts, Algae, Ferns and Lichens) to Room V. has left space for the proper arrangement of the Flowering Plants in Room III., which is now entirely given up to them. Formerly the greater part of the valuable *herbaria* which had been acquired was stowed away in paper parcels piled up on the tops of cupboards under dust sheets. Now, all these have been poisoned, mounted, arranged and catalogued, and it has taken a very large part of the time of the staff during the past ten years to do all this. Much still remains to be done, but we hope to be able to keep pace with future additions.

The Irish collections are, of course, the chief feature of Room III. and great trouble has been taken to make them thoroughly representative. The aim has been to get together a complete Topographical Flora of Ireland, that is, to have a specimen of each native and naturalised species from each of the 40 Topographical Divisions in which it grows. We have also aimed at having specimens of as many as possible of the alien species that are year by year appearing in crops and near mills, etc., introduced in foreign grain and in other ways. Most of these only spring up for a season and then disappear, some may be re-introduced or linger for a year or two, an odd one may flourish and naturalise itself. A great many of these aliens have been identified by the staff during the last 10 years and where the sender did not especially ask to have the specimen returned, it was dried, labelled and incorporated in the General Irish Herbarium. An idea of the magnitude of this Herbarium will be gathered from the fact that it contains about 80,000 sheets. Many of these are historically interesting, being record specimens collected by the veterans of Irish Field Botany.

This Irish collection is primarily intended for the use of Field Botanists, and to make it as serviceable as possible all the critical species such as the Water Ranunculi, Fumitories, Roses, Brambles, Hawkweeds, Pondweeds, Sedges, Grasses, etc., where there was any doubt as to the name, were submitted to the specialists in these groups. A complete list of the plants contained in the General Irish Herbarium will be found in the "Hand List of Irish Flowering Plants and Ferns," published by the Museum two years ago.

As well as specimens of the dried plants a large and fairly complete set of the seeds of these has been acquired by donation and purchase, and it is hoped before long to have a collection of seedlings of all the native and naturalised Irish species. A beginning has been made in getting these together, as it is felt that they would greatly add to the usefulness of the collections.

PLATE III.



Botanical Division--Room III. (*The Herbarium.*)

PLATE IV.



Embroidery Room, X-F.

There are, in addition to the General Irish Herbarium, others which for various reasons have not been incorporated in it, as for instance the large and very valuable Herbarium of A. G. More, containing all the Irish specimens collected and named by him, as well as a good representative set of British plants, also mainly of his own collecting; the Levinge Herbarium, rich in Westmeath and Burren plants, and, on loan, the large and interesting Herbarium of Mr. R. M. Barrington containing a fine set of Ben Bulbin plants, and those collected by Mr. Barrington on his various expeditions to the Islands off the coast of Ireland, etc.

Another feature of Room III. is the Students' Collection. Dried plants are very brittle and easily injured, and the specimens in the General Irish Herbarium are much too precious to be handled by any, but the experienced, those who realise that these are only on trust: that the Irish Herbarium is, as it were, a record office where the specimens are to be preserved to be handed on to future generations of students of Irish Field Botany in the best possible condition. But the needs of the ordinary student and school boy and girl have not been overlooked but are provided for in the Students' Collection, which contains a complete set of typical specimens of all the native and naturalised species—duplicates from the other Herbaria. These are arranged in a separate cupboard, and, as the specimens can be replaced in case of accident, students consulting them are allowed to do so without supervision.

The British Collections, which are also large and representative, have been greatly increased by the incorporation of the Lord de Tabley Herbarium presented some years ago. They have been arranged and catalogued on the same system as the Irish Collections.

In addition to the Irish and British Herbaria there is a very fairly complete set of Foreign plants, got together chiefly for purposes of reference and consultation.

Two good sets of *Materia Medica* specimens are also kept in Room III., one containing a complete set of samples of all the specimens mentioned in the British Pharmacopœia, and the other a set of German *Materia Medica*. Perhaps no collections in the Botanical Department are more often consulted than these. It is not unusual to have as many as ten students (men and women) making use of them in a day. A Bibliography of Irish Field Botany, brought up to date each month, a good working library, and several microscopes complete the equipment of the room.

III.—ART AND INDUSTRIAL DIVISION.

THE EMBROIDERY COLLECTION.

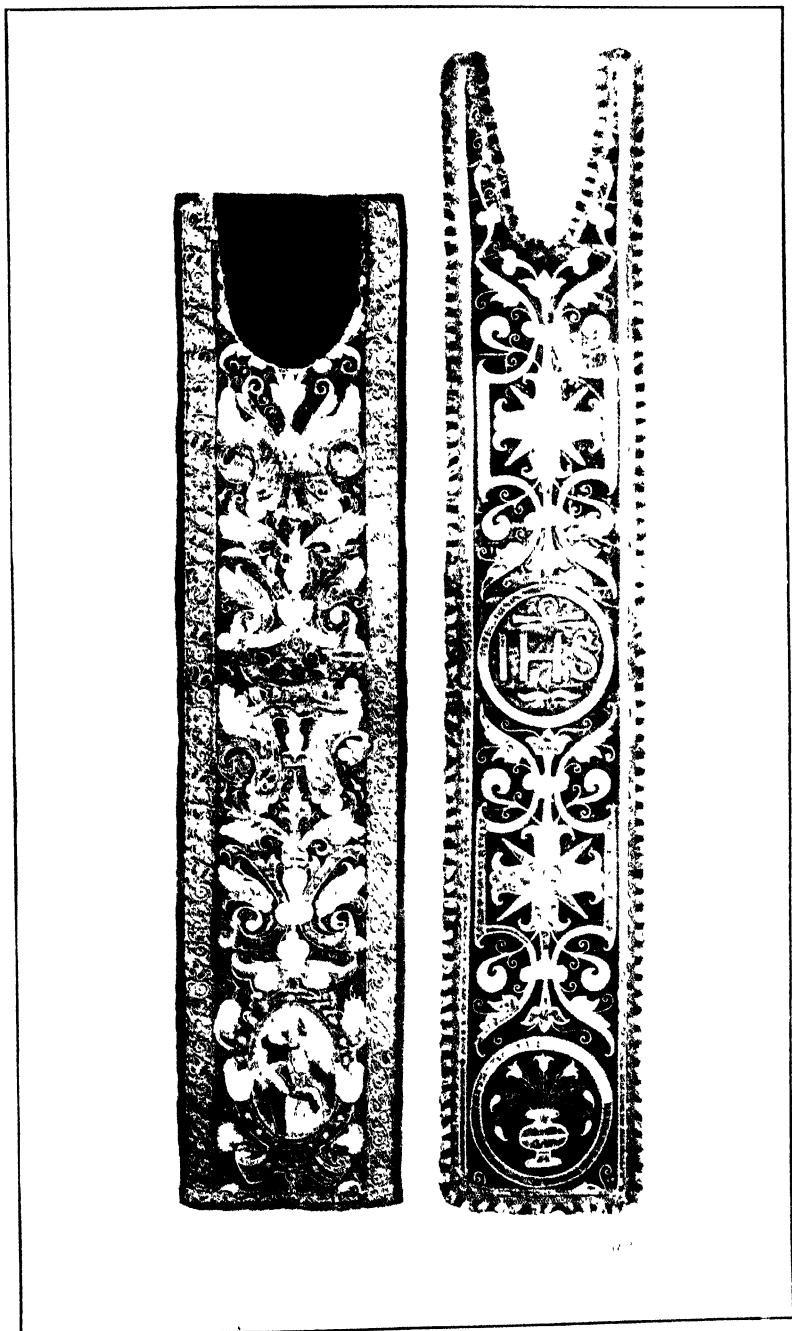
The embroideries are exhibited in Room X-F, and, with the exception of a small portion of the room given to the more important

ornamental textiles, now occupy the space formerly devoted to the lace, embroidery, and costume collections. The exhibiting space has been increased very considerably by a complete re-arrangement of the furniture of the room. The old double desk cases with storage drawers underneath have each been converted into two single desk cases and placed against the wall, leaving almost the whole floor space available for stands of frames similar to those containing the lace. (See Plate IV.) Shallow wall cases have been specially constructed for the wall-spaces between the pilasters above the dado mouldings. The wall-spaces between and below the windows have been hung with imperial size frames for coloured illustrations of celebrated examples of embroidery.

The collection includes a large number of valuable examples of Spanish sixteenth century work orphreys of copes and chasubles, etc. (see Plates V. & VI.) An Italian pilaster hanging of bold design hangs beside the west doorway. The French embroideries include a very valuable bedspread, the gift of Mrs. Seymour Gaynor and Miss Gaynor. It is early sixteenth century work and consists of an oblong centre of yellow figured silk with a broad border running along three edges, made up of eleven compartments each depicting an incident in the History of Joseph, in coloured silk needlework. The English work numbers a good many interesting specimens, the most notable of which is an antependium made from a fifteenth century cope. The ground is of dark greenish blue velvet, "powdered" with *fleurs de lys* and two-headed eagles radiating from the centre, occupied by a figure of the Blessed Virgin between angels. The powdering, etc. is worked in gold and silver thread and coloured silks. The orphrey of the cope consisting of Gothic niches with figures of Christ crucified and saints, in coloured silk embroidery, was divided up, and some portions were applied as borders to the upper and lower edges. The Stuart period is represented by two very characteristic pictures in the so-called "stump" embroidery (see Plate VII.) and by several examples of *petit point*. Later work includes a settee cover in Berlin wool work, lent by Colonel Moore, worked with the Lynch-Athy arms in silk *petit point*, and dated 1723; also a very beautiful late seventeenth century bedspread in brilliant conventional flowers on a lattice-work ground of yellow silk on white linen, with a wide border of closely-quilted linen in oriental design (perhaps Indo-Portuguese work), the property of Mrs. Dames-Longworth, and kindly lent by her.

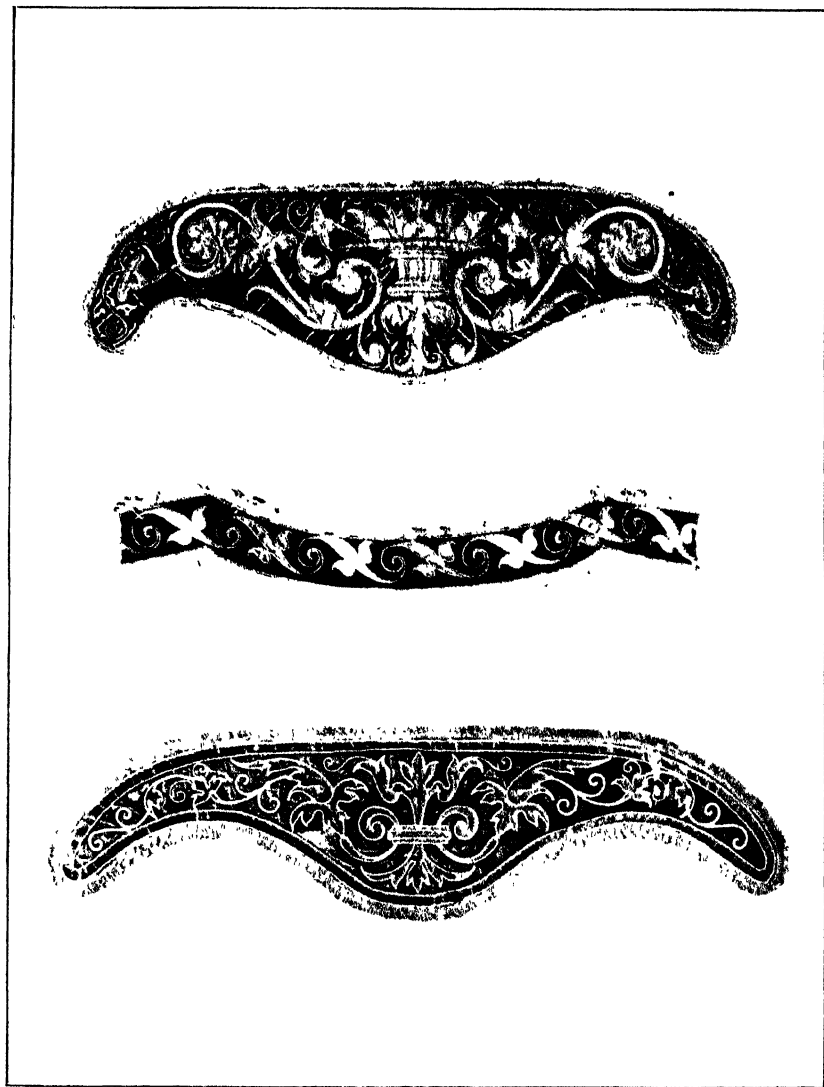
A beautiful example of Irish embroidery is the mitre, worked in coloured silks and gold in the style of the illuminated manuscripts of the early Christian period in Ireland. It is from the Convent of the Poor Clares, Kenmare. (See Plate VIII.)

Portion of an important collection of textiles and embroideries



Orphreys of Chasubles : Spanish, 16th Century.
(679 and 697—1880.)

PLATE VI.



Portions of Vestments : Spanish, 16th Century.
(582, 687 and 584 1880.)

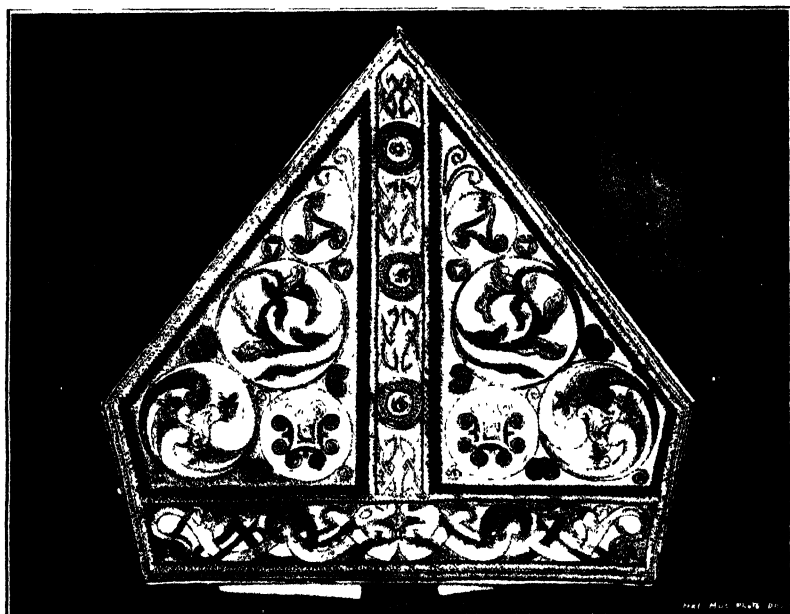


Stuart "Stump" Embroidery
(498- 1890.)

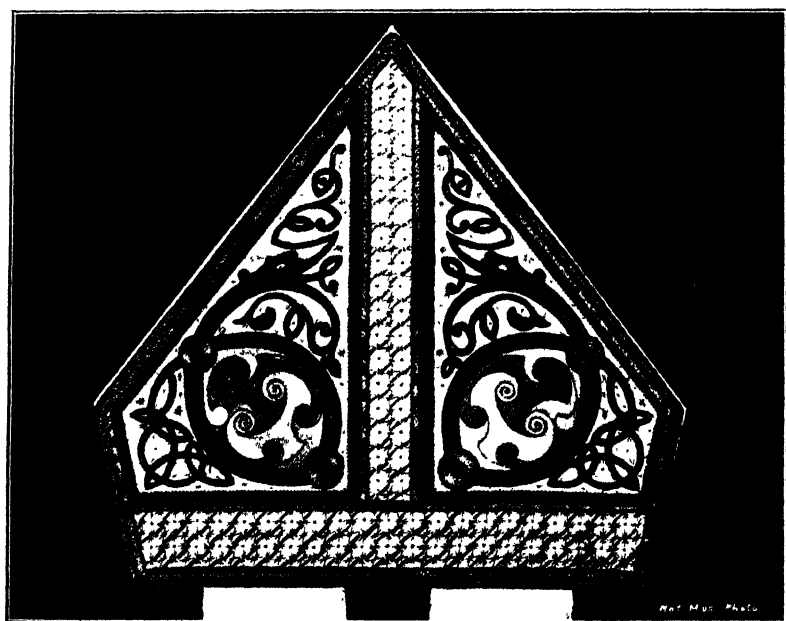


Stuart "Stump" Embroidery.
(397 -1891.)

PLATE VIII.



Mitre worked at Kenmare Convent.
(500 - 1902.)



Mitre worked at Kenmare Convent.
(500—1902.)

from the Necropolis at Elkhmin, on the Nile, about one hundred and fifty miles below Thebes, is exhibited. These specimens are the earliest examples of the use of the shuttle and needle in the collection, dating from the first century to the ninth.

A number of Japanese fukousas (i.e. cloths for covering presents) with their designs in brilliant colours and gold are a striking feature of the collection. A few Chinese embroideries are exhibited with these; others are exhibited in the Chinese Room IX.-F.

The specimens from this permanent collection of embroideries are frequently borrowed for study at the Metropolitan School of Art, the method of mounting in frames permitting of their transfer without much trouble or loss of time. A number of suitable specimens of a convenient size have been placed in the Circulation Collection.

J. J. B.

The Rev. H. Browne, S.J. M.A., Professor of Greek in the National University, has kindly arranged the loan of some very interesting fragments of early pottery, with the promise of ultimately sharing them with the National Museum, and he has written the following very interesting description of the collection.—J. J. B.

CRETAN POTTERY.

I. The neolithic stratum, which is prior to 3500 (or according to another view 3000) B.C., contains sherds belonging to the Stone Age. It is black, hand-polished and rudely ornamented with straight incised lines, especially zig-zags showing in some cases traces of a filling of white chalk; but in no case any other attempt at colour decoration. Some of these sherds suggest the shape and large size of various vessels; but so far no whole object has ever been unearthed by any excavator.

II. Above the neolithic stratum we come to pottery of the Bronze Age, or, to be more exact, the three ages entitled respectively the "Early," "Middle" and "Late" Minoan periods. They may be conveniently dated:

Early—3500 to 2500 B.C.

Middle—2500 to 2000 (or 1900) B.C.

Late—2000 (or 1900) to 1100 B.C.

The three main divisions of the Bronze Age are each in turn subject to a three-fold sub-division, giving in all nine distinct periods (without including the Neolithic Epoch, which has also been sub-divided into three periods). Restricting our view to what is easily discernible the Early Minoan ware is broadly distinguished from the Neolithic, inasmuch as it is rudely painted, though still mostly in straight lines, no doubt in imitation of the incised lines of the earlier fabric.

III. From the Early Minoan, which is monochrome, the Middle Minoan is easily distinguished by its polychrome character. It was the discovery of this ware by Mr. Myres at Kamares, which opened up a new vista of possible chronology, though its true relations were not fully ascertained till Dr. Evans produced at Knossus a large variety of the most exquisite vases made in this newly-discovered technique. Their shapes, as well as their decoration, are of extreme beauty, so that a long period for its development may be postulated. The clay has been frequently beaten out, like metal, to a thinness which has suggested the expressive title of "eggshell" pottery. Many of these polychrome vases are indeed strongly analogous in shape to the well-known cups of embossed gold work found at Vahio. It is worth remarking that some of the pottery is worked in relief, which is most probably due to the effort to imitate metallic work.

It is, however, the polychrome decoration, generally on a black or very dark ground, which most strongly differentiates the Middle Minoan potters' work from the Early as well as from the Late period. The colours are mostly various shades of red, yellow, and orange, along with white, all on the dark ground already mentioned. The motives of the decoration are almost exclusively geometrical, or non-naturalistic, consisting of various arrangements of bands of colour, rows of dots or rosettes, spirals, and all sorts of graceful patterns which would not disgrace the most skilful of modern designers. Some of the patterns do perhaps suggest floral motives, but, if so, they are always treated conventionally.

Among the specimens exhibited will be found several pieces which suggest the shape of the Vaphio cups of various sizes, and numerous schemes of pleasing decoration, including some patterns worked in relief. They mostly belong to Middle Minoan I. and II.

IV. The Late Minoan class is the same as the ordinary Mycenaean ware of the Schliemann epoch. It is in strong contrast with the Kamares ware, partly as being a return to the monochrome style of the Early Minoan age, and partly as tending to become more and more naturalistic in its decorative motives. In its full development it deals chiefly with marine subjects, such as shells, fishes, sea-weed, and above all the octopus, which it loves to depict, often with daring and brilliant success upon the characteristic Bugelkannen or false-necked vases. This class falls into two main divisions. Late Minoan I. and II. being taken together as being contemporaneous with the Great Palace at Knossus, and with the linear script of Dr. Evans; and the late Minoan III. after the fall of the Palace, about 1450 B.C., when the style began to decline, but the pottery, and in particular the Octopus Vase, are most widely diffused. The sherds of these two strongly divided periods are separated in the exhibit. Among those of Late Minoan I. and II. will be found several specimens which

still suggest some survival of the polychrome effects of the Kamareos period. But the Late Minoan pottery is all distinguished by its essential technique, which is that of a dark glaze (ranging from a reddish brown to black, according to the manner of firing) upon the natural ground of the clay, which is of a lightish grey colour. In the later and more decadent style the work becomes coarser, and no doubt it gradually declined into the pottery of the so-called Dark Age, which again became geometrical and of a quite inferior type. It is uncertain when the Mycenaean style finally expired; but it is probable that in Cyprus and in other regions out of the way, it lingered on nearly, if not quite, to the period when Greek history, properly speaking, takes its rise, in the eighth century B.C.

IRISH SEVENTEENTH CENTURY SPOONS IN THE NATIONAL MUSEUM.

The National Museum has lately acquired three important Dublin-made silver spoons of the second half of the seventeenth century. One of these, No. 130-11, is the earliest hall-marked Dublin spoon at present known, being a "slipped in the stalk" specimen, of 1655-6, made by Joseph Stoker. This spoon has the old fig-shaped bowl, while another in the Museum of the same year has the bowl broadened near the handle.

These two spoons, both of the year 1655-6, are most interesting as they illustrate the change in the form of the bowl which was then taking place. The old fig-shaped bowl had been in use from about the thirteenth or fourteenth century, while the more or less oval bowl, introduced early in the second half of the seventeenth century, was the forerunner of the present day oval and egg-shaped bowls.

Two other spoons lately acquired are a short flat stem example, No. 521-10, with oval shaped bowl, dated 1663-4, made by Abel Ram, and a flat stem trifid end one, No. 522-10, of the same year and by the same maker.

There is also another seventeenth century spoon in the Museum, viz., No. 5012 R.I.A., a flat stem trifid end one, of 1685, but it bears no maker's mark.

As far as is at present known these are the only Dublin-made spoons of the seventeenth century that are now extant.

There are, however, among the other spoons in the Museum two interesting specimens, viz.: a Puritan spoon with pricked date, 1665, and a trifid ended example with pricked date 1673, both of which have the anchor mark in the bowl and a skull twice stamped on the stem. These may be of Galway make, as the anchor occurs on plate made in Galway in the early part of the eighteenth century.

Spoons being of considerable antiquity, probably large numbers

of them were made in Ireland from early times. No examples in silver, however, of the apostle, seal-top, or other earlier spoons have as yet been found of Irish make.

Several brass spoons of these types have been found in Ireland, but it is uncertain if they were made in the country or imported from England.

Early in the seventeenth century a town mark was adopted for use on silver plate made in Dublin, but no piece bearing this mark has, up to the present, come to light. It is not until 1638, the year after the grant of the new Charter to the Dublin Corporation of Goldsmiths, that silver spoons are mentioned as having been made.

The form of the spoons made in Ireland appears to have been similar to that in fashion in England.

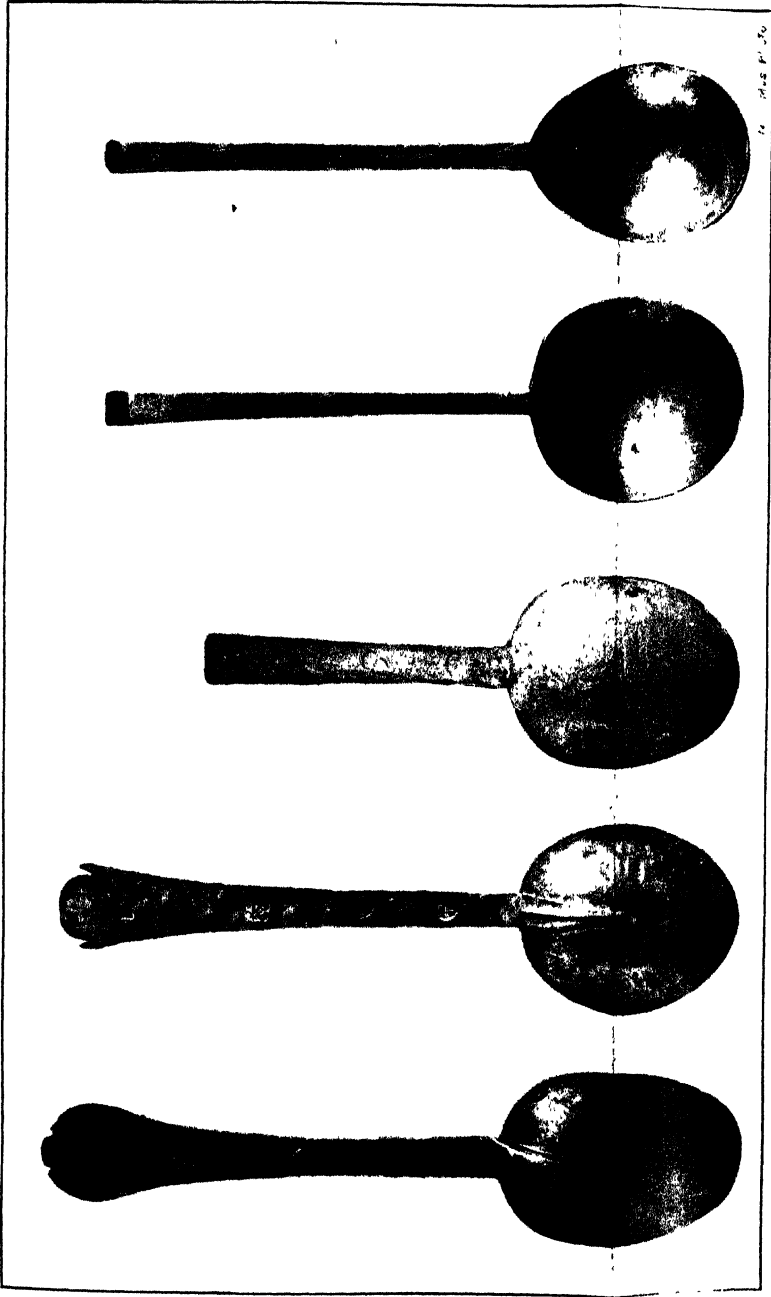
During the seventeenth century the apostle, seal-top, slipped in the stalk, puritan, and trifid end styles were in fashion, but Irish examples of the latter three only have been found up to the present.

The trifid end spoon in the Museum, No. 521-10, is probably the earliest British example of this type, English specimens generally dating from some years later.

M. S. D. W.

THOMAS PERRY: AN EIGHTEENTH CENTURY IRISH MUSICAL INSTRUMENT MAKER.

It is a pity that research, which has done so much towards illuminating the history of the Irish harpsichord and pianoforte makers of the eighteenth century, has done so little to place the life-story of Thomas Perry, the great violin-maker of the same period, on a firm foundation. At present there is nothing better to rely upon than the unscientific records of tradition. Even the country of Perry's origin is not known for certain. Guesswork has assigned his birth to the year 1767, but circumstances show that he must have been born at least ten years earlier. It is said that, like Molyneux, his Dublin predecessor in the art of violin-making, he was of Huguenot descent. It is also stated that he was related to Claude Pierray, a noted violin-maker who flourished in Paris in the first quarter of the eighteenth century and who held some of the secrets of the great Italian makers, particularly the composition of that fine red varnish which gave such a marvellous tone quality to the earlier instruments. Allied with the tradition that associates him with Claude Pierray of Paris is another of a contradictory order which would have us believe that Thomas Perry was originally the pupil of Duke, the London maker. The only foundation for this assertion lies in the fact that Perry's earlier violins, the instruments he made before coming to Ireland, are distinctly of the contemporary English type.



5012 R.I.A.

522-10.

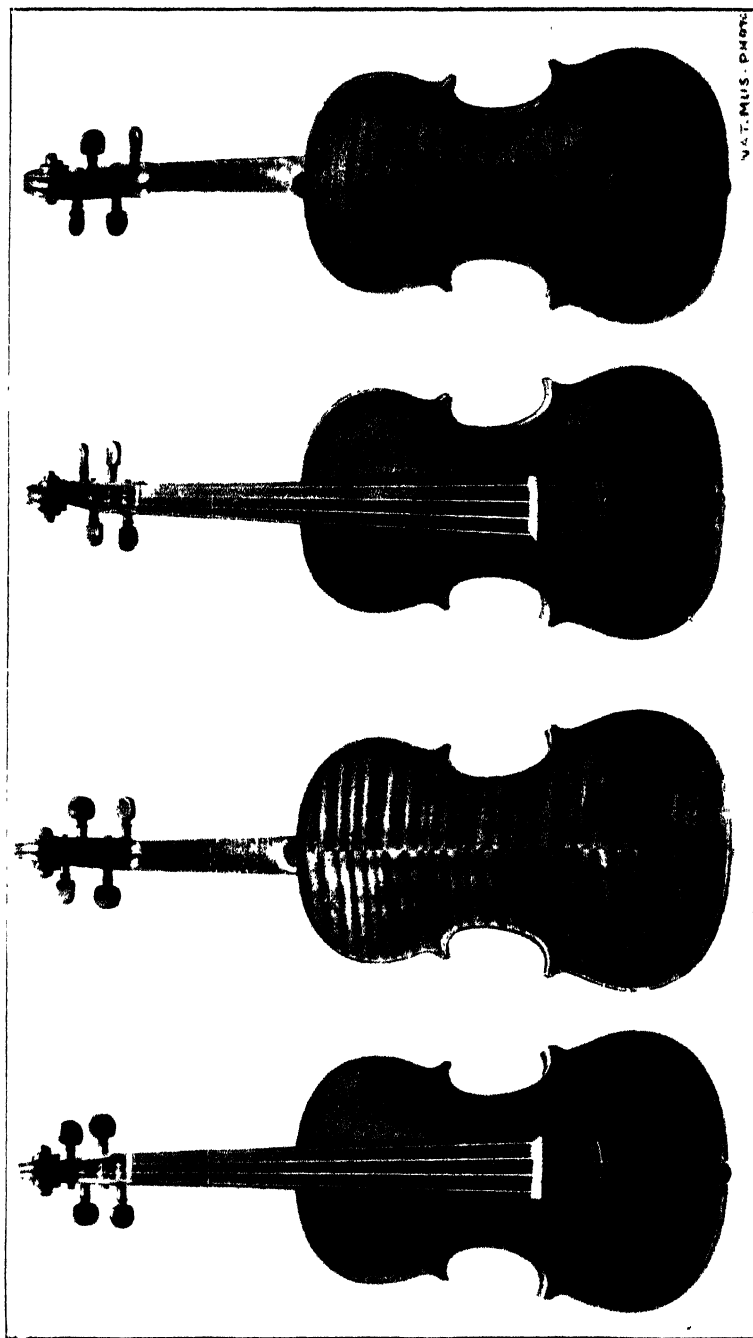
521-10.

376-92.

130-11.

Irish Seventeenth Century Silver Spoons

PLATE X.



1st and 2nd Violins. "Perry" Quartet (Cruise collection).
(Two examples of Perry's best period.)
(114 and 115-1908)

According to the traditional account (which is unassociated with any particular date), Thomas Perry, on first coming to Dublin, set up in business in a house near Christ Church Yard, in a locality long since altered beyond recognition. Be that as it may, the first definite trace of Perry in Ireland at a specific address occurs in 1787, when his name is recorded in *Wilson's Dublin Directory* as a musical instrument maker, of No. 6 Anglesea Street. Year after year his residence is given at that address until 1803, when he removed to No. 4* in the same street, and there remained until the period of his death.

Tradition accounts for the great difference between the fiddles made in England by Thomas Perry and those afterwards made by him in Ireland by the plausible assertion that his Dublin-made instruments were modelled on a rare old Italian violin lent him by the Duke of Leinster. There can be little doubt that he followed here the Amati model, but, even if we accept the Leinster story it does not account for his knowledge of that mysterious rich golden-amber varnish he employed, and to which much (but of course not all) of the fine quality of his violins was due. Accustomed to receive a good price for his instruments, sometimes as much as £20, he was particularly careful in the selection and seasoning of the wood. For the belly of his violins he usually chose a delicately grained Swiss pine wood, making the back and sides of maple. Although he now ranks as one of the best of the later eighteenth century instrument makers, his reputation is wholly posthumous, and of comparatively recent date. Connoisseurs have awakened to his merits, and his violins, already valuable, are found to command a steadily-increasing price, more particularly as comparatively few of them appear to be extant. The National Museum is in possession of five notable examples of his work; a quartet, formerly the property of Sir Francis Cruise, and a double bass viol, whose value may be estimated when it is said that no other Perry instrument of that class can now be traced.

It has been occasionally stated that the firm of Thomas Perry was altered during his lifetime to Perry and Wilkinson, that Perry took into partnership a quondam apprentice of his named William Wilkinson, who had married his daughter Elizabeth. This is not the case. The firm remained "Thomas Perry" till his death which took place, as the transcript of his will in the Public Record Office shows, in 1818, and not in 1830 as is frequently stated.

From the period of his death until at least 1831 (according to the evidence of *Wilson's Dublin Directory*) the business was carried on at No. 4 Anglesea Street, under the name of "Perry and Wilkin-

* Or possibly this might indicate (what occasionally happened in the old days) a renumbering of the houses in the street.

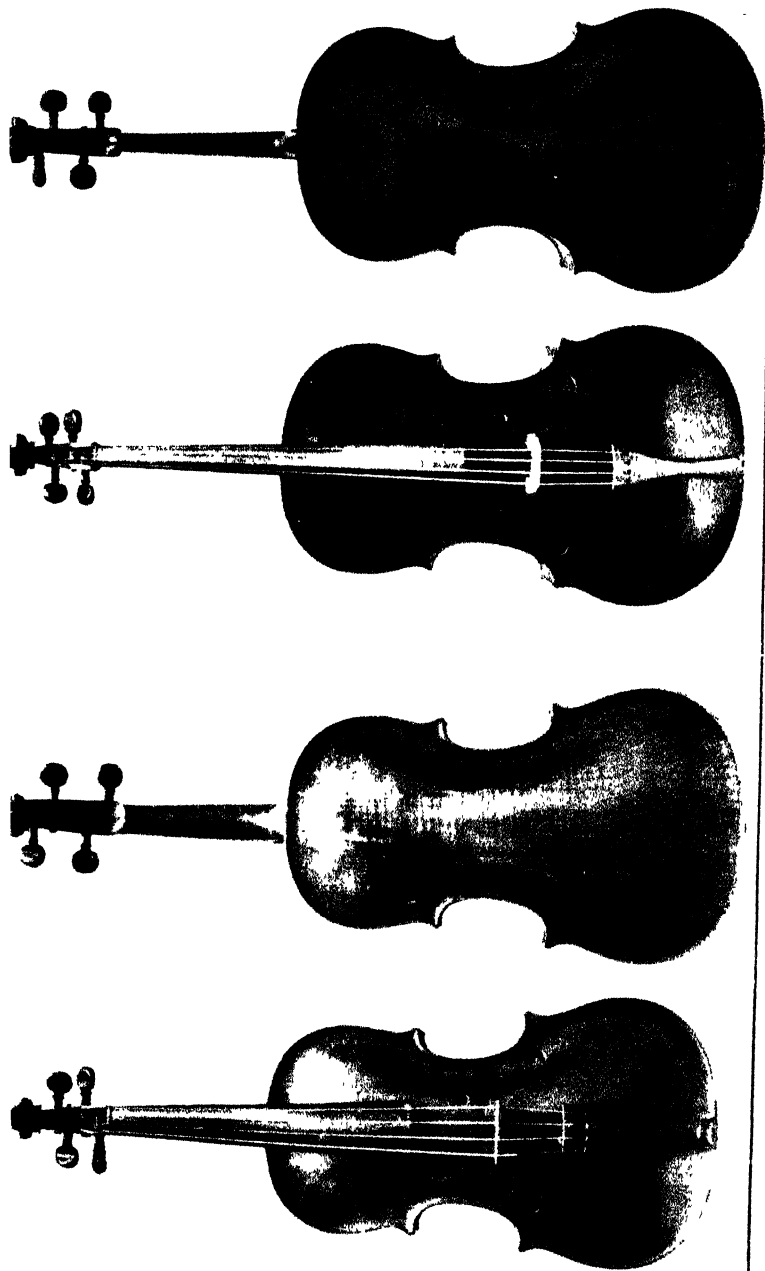
son." From 1881 to 1884 the same Directory gives only the name of William Wilkinson in connexion with that establishment. But, on referring to *Pettigrew and Dalton's Dublin Directory* for the next few years, we find that from 1884 till 1888 the firm was known again (if indeed any change had previously taken place) as "Perry and Wilkinson." In 1889 the business disappears altogether from Anglesea Street, but in that, and the following year, we find a William Wilkinson, musical instrument-maker, trading at No. 5 Essex Quay, and residing at No. 5 Rosanna Place, Portobello. Tradition, however, says this was not Thomas Perry's son-in-law.

Connoisseurs have frequently noted the bewildering inequality in Perry violins without ever divining the reason. The whole thing is due to a lack of historical knowledge and to a bunching together of violins made by Thomas Perry before 1818 with violins made by Wilkinson, trading as "Perry and Wilkinson," after that date. There can be little doubt that after Perry's death the standard of quality was seldom, if ever, maintained.

The foregoing facts will, to some extent, dissipate the perplexities which assailed Mr. J. M. Fleming when he wrote on "Perry & Wilkinson" in a series of articles entitled "Violins and their Value." "There appears to be," he says, "some uncertainty as to when the partnership terminated. It is supposed to have been in existence for about thirty-five years, but it is to be regretted that there is an absence of reliable information concerning the separate periods of activity of each member of the firm. If one were to judge by the figures inscribed on specimens of their work, the output was really enormous, the number found in an 1821 violin being 4,534! It is difficult to accept this as accurate, even on the assumption that every single specimen of the violin class was consecutively numbered from the beginning. There is no doubt that they made or sold a very large number of violins and a great many are still in existence. Some of these have the name of the firm branded on the back beneath the button. The model of the instruments bearing the firm's name is that of Amati, and a goodly number of them display workmanship of a very high order, but there are also numerous specimens that appear to have been made for them by others and not even under their supervision, as there is considerable diversity in the style of copying the model. In many of the latter class the varnish is of a light transparent tint, but in those of the more authentic personal examples it is of the rich Amati brown. The value of Perry and Wilkinson violins varies from £10 to £20 in the more ordinary work, but in the finer examples, when in perfect condition, it may reach £40."

The "finer examples" here really means those which were the undeniable work of Thomas Perry. The fact is that Perry

PLATE XI.



Viola.

Violoncello.

"Perry" Quartet (Cruise collection).
(113 and 112—1998)

PLATE XII.



Double Bass.

By Thos. Perry, Dublin.

A perfect specimen of this maker's work said to be unique.
(380—1908).

and Wilkinson were never in actual partnership. The terms of Perry's will clearly demonstrates this. Here we have at once the secret of the inequality of make, of "the considerable diversity in the style of copying the model," and of the difference in the varnish. Responsibility for the inferiority of Perry and Wilkinson's violins must not therefore be saddled upon Thomas Perry. Wilkinson was apparently more artisan than artist, and after Perry's death there was a painful lowering of the standard. Once these facts are grasped there will be a notable appreciation of Perry violins and a corresponding depreciation of those manufactured by Perry and Wilkinson.

A. McG.

OFFICIAL DOCUMENTS.

I.—TECHNICAL INSTRUCTION.

Form S. 314.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

UPPER MERRION STREET, DUBLIN.

SCHOLARSHIPS AT THE KILLARNEY SCHOOL OF HOUSEWIFERY.

The Department are prepared to offer to County Committees of Technical Instruction special facilities for the award of Scholarships for Girls, tenable at the Killarney School of Housewifery. This institution is under the Department's direct control and has for its object the Training of Girls in such work as would fit them for domestic service or the care of a home.

The following are the conditions under which Scholarships may be awarded :-

1. Applicants for the Scholarships must be resident in a rural district, and must have been in regular attendance at one of the Courses of Instruction in Domestic Economy conducted by the Committee of Technical Instruction for the county.

2. The scholars will be selected by the Department from the students nominated by County Committees of Technical Instruction. Each nomination must be accompanied by a report of the Domestic Economy Instructress upon the work of the applicant at the course of instruction attended.

3. Applicants for these Scholarships may be nominated for admission to the School on the 1st February or the 16th August. Nominations should be forwarded by County Committees so as to reach the Offices of the Department on or before the 1st of January or the 16th July.

4. The Scholarships will be tenable for the full course of training, which extends over about forty-six weeks.

5. A fee of £8, being one-half of the usual fee, will be payable by the County Committee in respect of each applicant nominated by them who is awarded a Scholarship, and the parent or guardian of the school will be required to pay the entrance fee of £1.

6. Scholars will be required to conform to all the conditions set forth in the School Programme.

7. The Department reserve the right to determine a Scholarship without notice, upon being satisfied that its continuance is for any reason undesirable.

8. The decision of the Department in all questions arising in connection with the Scholarships shall be final.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

TRAINING OF TEACHERS OF CROCHET-WORK AND SPRIGGING.

The Department will, in September, 1911, award not more than three Scholarships, tenable at the Training School for Lace and Sprigging Teachers, Enniskillen, to girls having a satisfactory general education, and some proficiency in Crochet-work or Sprigging.

These Scholarships are granted to enable the holders to secure training as teachers of Crochet-work or Sprigging.

The Scholarships will be of the value of £25 each and will be tenable for one year. The Department reserve the right to determine a Scholarship at any time upon being satisfied that its continuance is for any reason undesirable.

Each candidate for a Scholarship will be required to submit to the Department with the form of application, specimens of her work in either Crochet-work or Sprigging.

Should the work submitted be regarded as of a satisfactory standard, the candidate will be admitted to an examination which will consist of simple tests in English, Arithmetic, Drawing, and Crochet-work or Sprigging.

The Scholarship will be awarded as a result of the examination. (Not more than one Scholarship will be awarded in the case of candidates from any one County.)

The examination will be held at the Metropolitan School of Art Dublin, and at the Technical School, Enniskillen, on the following dates :—

Dublin : Crochet-work or Sprigging, on Tuesday, 12th September.

English, Arithmetic and Drawing, on Wednesday, 13th September.

Enniskillen : English, Arithmetic and Drawing, on Wednesday, 13th September.

Crochet-work or Sprigging, on Thursday, 14th September.

Candidates will be required to defray their own expenses in attending the examination.

Candidates must be at least 20 years of age on the 1st September, 1911, and must have been born in Ireland or have resided in the country for three years immediately preceding that date.

Two Certificates of good character will be required from all applicants, and selected candidates will be required to produce a medical certificate of health and an authenticated copy of certificate of birth.

The decision of the Department in regard to the selection of candidates or to any other question arising out of these Scholarships will be final.

Applicants must fill in and return, addressed to the Secretary of the Department, Form S. 197, copies of which may be had on application, together with specimens of work in Crochet or Sprigging. (Two specimens of finished work and two specimens of work in progress should be furnished.)

Only those applications received at the Offices of the Department by 12 noon on Saturday, August 26th, 1911, will be taken into consideration.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET,
DUBLIN, *June, 1911.*

SIR OR MADAM,

I have to acquaint you that in the Programme for Day Secondary Schools for the Session 1911-12, which will shortly be issued, provision is made for an additional Special Course in Experimental Science. The subject of the Course is Physical and Commercial Geography, and an outline Syllabus is printed as an Appendix to this Circular Letter. The Course in Physical and Commercial Geography has been adopted by the Intermediate Education Board, and will form one of the subjects in "Experimental Science" at the Intermediate Examinations in 1912.

In order to afford teachers of Experimental Science training in the method of teaching the new syllabus, the Department are arranging for a course of instruction in the subject (Third Year Syllabus) to be held at the Royal College of Science, Dublin, from the 4th to the 28th July, under the conditions of Form S. 41. Should your Managers decide to adopt the course in substitution for, or in addition to, the Special Course, or Courses, already in operation at the School the Department would be prepared to admit not more than one member of the teaching staff from the above-named School. Admission to the Course will however, be restricted to teachers who are already recognised by the Department as qualified to give instruction in the Preliminary Course of Experimental Science.

The Department will not this year be in a position to arrange for courses of instruction in the subject for Members of Enclosed Religious Orders.

I am,

Sir or Madam,

Your obedient Servant,

T. P. GILL,

Secretary.

SYLLABUS IN PHYSICAL AND COMMERCIAL GEOGRAPHY

THIRD YEAR SYLLABUS.

PHYSICAL GEOGRAPHY.

A.—The preliminary instruction in Physical Geography should be based upon a study of the Home district, involving:—

- (1) The making of sketch plans of the school building and surrounding districts.
- (2) Observation of the rocks of the neighbourhood.
- (3) A detailed study of a neighbouring stream with the object of observing and interpreting examples of "weathering" and water-action.

(4) Principles of a "survey" of the district in which use is made of

- (a) a measuring chain,
- (b) a simple plane-table, and
- (c) a reflecting level.

Construction of contour-models. Comparison of the features of the country with their representation on published ordnance maps.

B.—*The Figure, Motions and Position of the Earth.*

- (1) A study of the terrestrial globe. Latitude and longitude.
- (2) A study of the apparent daily motion of sun, moon and stars. Changes during month and year. Eclipses.
- (3) The connection between climate and latitude, water areas, etc. The course of the Seasons.

C.—*The Atmosphere.*—Practical work will include the regular and systematic use of the barometer, thermometer, rain gauge, etc., and the keeping of meteorological records. These will form a guide by which to interpret weather reports. Storms and cyclones. Trade winds. Connection between physical features and climate.

D.—*The Land.*

- (1) A comparison of continental areas. The origin of mountain chains, plains, plateaus, valleys, fjords, bays, and other familiar features.
- (2) A more detailed study of map-making and the use of maps of various kinds. Methods of projection.

E.—*The Geography of Ireland (General).*

FOURTH YEAR SYLLABUS.

PHYSICAL GEOGRAPHY.

The Sea.—Distribution of land and water. Deposits along a shore: deltas and sea beaches. The limestone-builders; shell-banks and coral-reefs. Contrast of shore deposits and those of the deep sea.

COMMERCIAL GEOGRAPHY.

(1) The influence of geography on national character, habit, and occupations.

(2) Natural Products. The sources of the world's food. The fibres. Timbers. Animal products. Fisheries. Mineral products.

(3) A general survey of the flow of trade as deduced from Returns, with a more detailed examination of the Returns of Imports and Exports for Ireland.

(4) A general study of the great industrial countries and their social systems.

(5) Transport. The great trade routes. The great canals and railway systems. Development of railways in a newly-settled continent, such as America or Africa.

(6) The use of railway time tables, and of the British and Continental "Bradshaw." Illustrate, for example, by a comparison of routes between European capitals.

CIRCULAR 6.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET,
DUBLIN, *July, 1911.*

SIR,

I have to inform you that, from time to time in recent years, applications for permission to conduct special classes in Domestic Economy subjects for National School pupils during ordinary National School hours were received by the Department from local Technical Instruction Committees. The Department, whilst in sympathy with the proposal, were precluded by Section 30 (1) of the Agricultural and Technical Instruction (Ireland) Act, 1899, from approving of the application of Technical Instruction funds towards defraying the cost of such instruction as is given in elementary schools. As a result, however, of negotiations between the Department and the Commissioners of National Education, who had funds capable of being applied to classes of this kind, a scheme was provisionally adopted and put into operation at a few selected centres as an experiment during the academic year 1909-10. The reports received from the different centres showed that, while the operation of the scheme from an educational point of view was satisfactory, the grant of five shillings per head which the Commissioners allowed was insufficient to meet the full cost of conducting the classes. These facts were duly communicated to the Commissioners, who made representations to the Treasury, with the result that the grant has been increased to seven shillings and sixpence per head. This rate of grant will be applicable to classes held in this and future sessions. The conditions under which this grant may be earned are printed on the accompanying form (No. S. 315).

The Department are of opinion that the grant of 7s. 6d. now available will be found sufficient to meet the cost of classes of this kind, and they are prepared to approve of the organisation by your Committee of such classes, provided that the successful working of the scheme of Technical Instruction is not thereby impaired.

I am,

Sir,

Your obedient Servant,

T. P. GILL,

Secretary.

To the Secretary
of the Committee named in the Address.

Form S. 315.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

**CONDITIONS FOR THE CONDUCT, IN TECHNICAL SCHOOLS
AND DURING ORDINARY NATIONAL SCHOOL HOURS,
OF CLASSES IN DOMESTIC ECONOMY (COOKERY AND
LAUNDRY-WORK) FOR NATIONAL SCHOOL PUPILS.**

(1) Any pupil who is in the Fifth, or a higher, Standard may be enrolled, but girls who have reached the age of eleven may also attend, even though they are enrolled in a lower Standard than the Fifth.

(2) A course of instruction in Cookery must extend over five months in the year and must include not less than twenty-five lessons of one and a-half hours' duration each. A course of instruction in Laundry-work must extend over five months in the year, and must include not less than twenty lessons of one and a-half hours' duration each. A course of instruction in the alternative syllabus in Cookery and Laundry-work, combined as a single subject, must extend over five months and must include not less than twenty-five lessons of one and a-half hours' duration each. Of these lessons at least fifteen must be lessons in Cookery, and six lessons in Laundry-work.

(3) The attendance of girls at instruction must be recorded in special registers (Form S. 27), and attendance must be marked before the beginning of the lesson. A pupil may not receive credit for attendance at a lesson on any day (except Saturday) on which she has not been in attendance at the National School.

(4) The Syllabuses of instruction shall be those prescribed by the Commissioners of National Education in their Rules and Regulations in force for the time being.

(5) Classes shall be limited to 20 pupils.

(6) The Managers of National Schools desirous of entering pupils for instruction in Domestic Economy in Technical School classes must produce a letter from the Secretaries to the National Board containing the sanction of the Commissioners as prescribed by Rule 128 (e) (1) of their Rules and Regulations.

(7) The classes shall be at all times open to the Inspectors of the Department, who will report to the Department as to the character and efficiency of the instruction.

(8) The conduct of the classes may not entail any charge on the funds of the Technical Instruction Scheme.

(9) Applications for copies of the Attendance Register (Form S. 27) should be made by letter stating the number required. A separate Register must be used for each class. Claims for grants in respect of attendances made before the receipt by the managers of the official Registers will not be entertained.

(10) A Time-Table of the classes to be furnished to the Department, within a fortnight after their opening, on Form S. 46.

The Commissioners of National Education will make a grant of seven shillings and sixpence in respect of each girl taught Domestic Economy, under the conditions set out above, who has attended at least 50 per cent. of the prescribed minimum number of lessons in the subject taught. The grant will not be paid for the same pupil for more than two years in Cookery, one year in Laundry-work, not for more than three years in the alternative syllabus in Cookery and Laundry-work combined as a single subject. Not more than one grant will be paid in respect of the same pupil in the same year.

Pupils who have already taken up the courses in Cookery and Laundry-work as separate subjects must continue to follow the courses in these subjects, and those pupils who, in future, take up the alternative syllabus in Cookery and Laundry-work must adhere to it.

The grant may be reduced or withheld if the proficiency attained is not satisfactory.

II.—VETERINARY.

ALPHABETICAL LIST OF SHEEP DIPS

Which have been approved up to 15th June, 1911, by the Department of Agriculture and Technical Instruction for Ireland, under the Sheep Scab (Ireland) Order of 1905, in addition to those specified in the Second Schedule to that Order.

NOTE.—As it is by the manufacturers or proprietors that the names given to Dips have been selected, no responsibility is assumed by the Department for the use of the term "Non-Poisonous" in the title of any Dip.

Name of Dip	Name and Address of Manufacturer or Proprietor	Proportion of dilution in water approved for each dip when used for Sheep Scab	
		Quantity of Dip	No. of Gallons of Water
Albion Powder Dip, . . .	P. N. White, Chemist, Sligo,	1 lb. 14 ozs. (1 packet)	20
Antiseptic Dip, . . .	The North of Ireland Chemical Co., Ltd., Belfast,	1 gallon	50
Do. (hot water quality), . . .		1 gallon	50
Bailey's Powder Sheep Dip, . . .	Wm. Bailey & Son, Horsley Field Works, Wolverhampton,	2 lbs.,	25
Bailey's Fluid (Non-Poisonous) Sheep Dip and Cattle Wash, . . .		1 gallon	50
Bankhall Sheep Dip, . . .	The Bankhall Chemical Company, Bankhall Bridge, Canada Dock, Liverpool,	1 part	50 parts
Barratt's Non-Poisonous Sheep and Lamb Dipping Composition — Northern Brand, Liquid Quality, . . .	Messrs. J. Barratt and Company, Middleton, near Manchester,	1 gallon	80
Barratt's Non-Poisonous Sheep and Lamb Dipping Composition — Northern Brand, Paste Quality, . . .		1 lb.	5
Battle's Fluid Sheep Dip, . . .		1 gallon	60
Battle's Powder Dip, . . .		1 lb. 14 ozs.	20
Battle's Paste Dip, Non-Poisonous, . . .	Battle, Maltby & Bower, Victoria Chemical Works, Lincoln,	10 lbs.	50
Battle's Paste Dip, Poisonous, . . .		10 lbs.	50
Bell and Riddle's Fluid Sheep Dip, . . .		1 gallon	60
Bell and Riddle's Prepared Cresolene, . . .		1 gallon	49
Bell and Riddle's Special Non-Arsenical Sheep Dip, . . .		10 lbs.	50
Bell and Riddle's Improved Powder Dip and Fly Powder, . . .	Bell & Riddle, Analytical Laboratory, Hexham,	2½ lbs.	25½
Bell and Riddle's Soluble Oil Sheep and Lamb Dipping Composition, . . .		10 lbs.	50
Bell and Riddle's "Triol" Dip, . . .		1 gallon	90
Beta-Lysol Sheep Dip, . . .	Messrs. C. Zimmermann and Company, 9 and 10 St. Mary-at-Hill, London, E.C.,	1 gallon	50
Bigg's "Glenovis" Sheep Dip, . . .	Messrs. Day, Son and Hewitt, 11½ Great Dover St., London, S.E.	2 lbs.	21
Bigg's Paste Dip, . . .		1 lb.	7
Bishop's Arsenical Carbolic Dip, . . .	B. B. Harescough & Co., Ltd., Chemical Works, Skipton,	7½ lbs.	50
Brittain's Powder Dip, . . .	F. W. Brittain, The Medical Hall, 84 West Street, Drogheda,	1 lb. 14 ozs. (1 packet)	20
Broderick's Powder Dip, . . .	J. J. Broderick, Chemist, Fermoy,	1 lb. 14 ozs. (1 packet)	20

Name of Dip	Name and Address of Manufacturer or Proprietor	Proportion of dilution in water approved for each dip when used for Sheep Scab	
		Quantity of Dip	Gallons of Water
Calvert's Carbolic Sheep Wash,	F. C. Calvert & Co., Bradford, Manchester,	1 gallon	100
Carbolic Paste Dip,	B. B. Harescough & Co., Ltd., Chemical Works, Skipton,	10 lbs.	60
Carbolic and Arsenical Paste Dip,	Joseph G. Robertson, Manufacturing Chemist, 327 Pollokshaws Road, Glasgow,	10 lbs.	70
Celtic Dip,		1 gallon	50
Cheviot Carbolic Fluid Sheep Dip,		1 gallon	75
Cheviot Carbolic Paste Sheep Dip,	Messrs. Burn and Gilhes, Highgate Chemical Works, Tweedmouth, Berwick-on-Tweed, England,	1 lb.	5
Cheviot Fluid Sheep Dip,		1 gallon	75
Cheviot Concentrated Fluid Sheep Dip,		1 gallon	50
Cheviot Paste Sheep Dip,		1 lb.	5
Cheviot Powder Sheep Dip,		2 lbs.	18
Cheviot Fly Paste Sheep Dip,		1 lb.	5
Clements' Sheep Dipping Fluid	A. Clements, Chemist and Druggist, The Medical Hall, Cootehill,	1 gallon	70
"Clinax" Poisonous Powder Sheep Dip,	The Boundary Chemical Co., Ltd., Railway Arches, Lutob Street, Liverpool	1 lb.	10
"Clinax" Liquid Non-Poisonous Sheep Dip,		1 gallon	50
Conway's Powder Dip,	J. J. Conway, Chemist, Naas,	1 lb. 14 ozs. (1 packet)	20
Conway's Fluid Sheep Dip,		1 gallon	70
Cooke's Powder Dip,	William Cooke, The Medical Hall, Gorev,	1 lb. 14 ozs. (1 packet)	20
Cooper's Powder Dip,	It H. Cooper, Medical Hall, Wexford,	1 lb. 14 ozs. (1 packet)	20
Cooper's "Albyn" Fluid Sheep Dip,		1 gallon	100
Cooper's Milk Oil Fluid Dip,		1 gallon	50
Cooper's Sheep Dipping Powder,	Messrs. W. Cooper and Nephews, Chemical Works, Berkhamsted,	30 ozs.	20
Cooper's Fluid,		1 gallon	80
Cooper's "Albyn" Paste Dip,		1 lb.	5
"Corona" Sheep Dip,		1 lb.	10
"Delight" Sheep Dip,	Joseph Dee & Sons, 5 Cross Street, Manchester,	1 part	100 parts
Devlin's Powder Dip,	P. J. Devlin, L.P.S.I., Chemist, Thurles,	1 lb. 14 ozs. (1 packet)	20
Donald's Liquid Sheep Dip,		1 gallon	75
Donald's Powder Sheep Dip (Poison)		1 lb. 14 ozs. (1 packet)	20
Donald's Sheep-Dipping Composition,	Messrs. Donald & Co., New Scone, Perth,	10 lbs.	65
Donard Fluid Dip,	Wm. Clements, Duncruc Street, Belfast,	1 part	20 parts
Donard Paste Dip,		1 part	20 parts
Doyle's Powder Dip,	W. Doyle & Co., Registered Druggists, Athlone,	1 lb. 14 ozs. (1 packet)	20
Doyle Brothers, Powder Dip,	Doyle Brothers, Registered Druggists, Athy,	1 lb. 14 ozs. (1 packet)	20
Empire Concentrated Fluid Sheep Dip, Winter Quality, W.W.,		1 gallon	75
Empire Improved Sulphur Carbolic Sheep Dip, Winter Quality, W.W.,		1 gallon	46
Empire Protective (Fly) Paste Dip (Poisonous),		21 lbs.	160
Empire Improved Sulphur Carbolic Dip, Summer Quality,	A. R. Ewing, "Empire" Works, Carnytne, near Glasgow,	1 gallon	46
Empire Improved Sulphur Carbolic Sheep Dip, Winter Quality, W.,		1 gallon	46
Empire Concentrated Fluid Sheep Dip, Summer Quality,		1 gallon	75
Empire Concentrated Fluid Dip, Winter Quality, W.,		1 gallon	75
Ewe Rain (Non-Poisonous) Sheep Dip,	Messrs. Reid & Robertson, 68 Hyde Park Street, Glasgow,	25 lbs.	40
Ewe Rain (Poisonous) Sheep Dip,		25 lbs.	80

Name of Dip	Name and Address of Manufacturer or Proprietor	Proportion of dilution in water approved for each dip when used for Sheep Scab	
		Quantity of Dip	No. of Gallons of Water
"Elswick" Sheep Dip,	Davis, Goodall & Co., Newcastle-on-Tyne,	1 gallon	60
"F. B. Sheep Dip,"	Messrs. Fenner Brothers, Little Island Chemical Works, Cork,	1 part	50 parts
Farmers' Sheep Dip (No. 1, 2, 3),	Hall, Dunbar & Co., St. Ninian's Works, Leith.	1½ gallons	80
Federation Antiseptic Dip,	The Irish Agricultural Wholesale Society, 151 Thomas Street, Dublin	1 gallon	50
Federation Antiseptic Dip (hot water quality),		1 gallon	50
Federation Sheep Dipping Powder,		2 lbs.	20
Fielding's Liquid Sheep Dip,	P. J. Fielding, F.C.S., 66 Patrick Street, Cork,	1 pint	10
Germokill Sheep Dip,	The Apothecaries' Hall of Dublin, 10 Mary St., Dublin.	1 part	60 parts
Goldon's Powder Dip,	Goldon & Co., Medical Hall, Burr.	1 lb. 14 ozs. (1 packet)	20
"Golden Magnet" Sheep Dipping Powder,	Cope Brothers & Co., Ltd., Lord Nelson Street, Liverpool.	5 lbs.	10
Gorry's Fluid Dip,	Joseph Gorry, 54 South Main Street, Naas,	1 gallon	60
Gorry's Powder Dip,	Grindley & Co., Ltd., Poplar, London, E.	30 ozs. (1 packet)	20
Grindley's "Pioneer Brand" Sheep Dip,	Grindley & Co., Ltd., Poplar, London, E.	1 gallon	70
Hadden's Powder Dip,	Hadden's Medical Hall, Wexford, New Ross and Enniscorthy.	1 lb. 14 ozs. (1 packet)	20
Hamilton's Powder Sheep Dip,	W. J. Hamilton, Druggist, Gortin.	1 lb. 14 ozs. (1 packet)	17
Harrington's Specific Sheep Dip,	Cork Chemical and Drug Co. Ltd., Cork,	1½ lbs.	13
"Harvey's Improved Sheep Dip,"	J. W. Harvey, L.P.S.I., 31 Great George's St., Cork,	1 gallon	70
Hayward's Yellow Paste Dip,	Messrs. Tomlinson & Hayward, Ltd., Lincoln,	1 lb.	10
Hayward's Combined Glycerine Sheep Dip,		1 lb.	5
Hayward's Glycerine Dip (Non-Poisonous Paste or Bloom),		1 lb.	5
Hayward's Liquid (or Fluid) Dip,	Luke J. Healy, Chemist and Druggist, Drogheda	1 gallon	60
Hayward's "Glycerine" Dip,		1 lb.	4
Hayward's "Glycerine Cake" Dip,		1 lb.	5
Healy's Powder Dip,	F. Hewthorn & Co., Ltd., 70 Finsbury Pavement, London, E.C.	1 lb. 14 ozs. (1 packet)	20
Hewthorn's Wool Improving Sheep Dip,		1 gallon	48
"Highland" Fluid Sheep Dip,		1 gallon	75
"Highland" Powder Sheep Dip,	Messrs. Alex. Robertson & Sons, Agyle Chemical Works, Oban, N.B.	1 lb. 14 ozs. (1 packet)	17
"Ialine" Sheep Dip,	Burt, Bolton & Haywood, Ltd., 61 Cannon St., London, E.C.	1 gallon	70
Jackson's Fluid Sheep Dip,	Ethelbert Jackson & Co., Harbour Road, Swansea,	1 gallon	50
Jackson's Powder Sheep Dip,		29 ozs. (1 packet)	16
Jeyes' Non-Poisonous Sheep Dip,		when used in a hand bath	20
"John O'Gaunt" Paste Dip, (No. 3),	Jeyes' Sanitary Compounds Co., Ltd., 64 Cannon Street, London, E.C.	when used in a swim bath	60
Kennedy's Sheep Dipping Powder,	Maudsley & Son, The Arcade, Lancaster.	10 lbs.	30
Kiloh's Non-Poisonous Liquid Sheep Dip,	W. P. Kennedy, Borris, Co. Carlow,	30½ ozs. (1 packet)	15
	Messrs. Kiloh & Co., Ltd., Cork.	1 part	50 parts

Name of Dip	Name and Address of Manufacturer or Proprietor	Proportion of dilution in water approved for each dip when used for Sheep Scab	
		Quantity of Dip	No. of Gallons of Water
Kiloh's Sheep Dipping Composition.	* Messrs. Kiloh & Co., Ltd., Cork,	4 lbs.	13
Kiloh's Sheep Dipping Powder.		1½ lbs.	13
Lawes' Fluid Dip.		1 gallon	40
Lawes' Ealyplos Sheep Dip.	Lawes' Chemical Co., Ltd., 59 Mark Lane, London, E.C.	5 lbs.	30
Lawes' Paste Dip, Poisonous.		1 lb.	8
Lawes' Paste Dip, Non-Poisonous.		1 lb.	8
Lawes' Powder Dip.		2 lb.	20
Lawrie's Powder Dip.	Crawford, Cree & Lawries, Ltd., Glasgow,	1 lb. 14 ozs. (1 packet)	20
Little's Improved Fluid Dip.		1 gallon	75
Little's Non-Poisonous Cake Sheep Dip.		1 lb.	5
Little's Non-Poisonous Fluid Sheep Dip.		1 gallon	50
Little's Non-Poisonous Paste Sheep Dip.	Morris, Little & Son, Ltd., Doncaster,	1 lb.	5
Little's Poisonous Liquid Dip.		1 gallon	60
Little's Poisonous Powder Sheep Dip.		30 ozs.	20
Little's Poisonous Fly Paste Sheep Dip.		1 lb.	8
Liquid Carbolic Sheep Dip.	B. B. Harescough & Co., Ltd., Chemical Works, Skipton,	1 gallon	80
"Long's Specific."	Messrs. Corry & Co., Ltd., 13 and 15 Finsbury Street, London, E.C.	1 gallon	5
MacMahon's Powder Sheep Dip.	N. B. MacMahon, Killeter, Co. Tyrone,	1 lb. 14 ozs. (1 packet)	17
Magee's Royal Meath Powder Sheep Dip.	E. P. Magee, Veterinary Chemist, Kells,	1 lb. 14 ozs. (1 packet)	17
Mallen's Carbolic Paste Dip.	Mallen & Co., 89 Upper Dorset Street, and Blessington Lane, Dublin	1 lb.	2½
Mallen's Powder Dip		5 lbs.	14
Martin's Hellebore and Carbolic Sheep Dip.	John Martin, 50 West Scotland Street, Glasgow,	1 lb.	3
McDougall's Border Paste Dip (Poisonous).		1 lb.	6
McDougall's "Heather" Paste Dip.		1 lb.	6
McDougall's Powder Dip, free from Arsenic.		1½ lbs.	10
McDougall's Improved Concentrated Liquid Sheep Dip		1 part	100 parts
McDougall's Grease Sheep Dip.		3 lbs.	5
McDougall's Sheep Dip (Paste or Hot Water Quality).	McDougall Bros., 68 Port Street, Manchester,	1 gallon	50
McDougall's Sheep Dip (Cakes and Blocks) Hot Water Quality (Patented).		1 part	50 parts
McDougall's Arsenic Sulphur Dip.		5 lbs.	40
McDougall's Liquid Sheep Dip (Cold Water Quality).		1 gallon	80
McGee's Powder Dip (Poison)	Patrick McGee, Merchant, Ardee,	1 lb. 14 ozs. (1 packet)	20
McGuire's Sheep Dip and Cattle Wash.	Hugh McGuire, Quay, Wexford,	1 gallon	60
McHugh's Powder Dip.		1 lb. 14 ozs. (1 packet)	20
McHugh's Fluid Dip.	J. J. McHugh, Medical Hall, Athy,	1 gallon	60
McHugh's Paste Dip, Non-Poisonous.		10 lbs.	50
McLeod's Non-Poisonous Sheep Dip.		10 lbs.	50
McLeod's "Universal" or Poisonous Sheep Dip.	F. H. McLeod & Sons, 61 Bishop Street, Anderston, Glasgow,	10 lbs.	50
Miller's Sheep Dip.	R. Miller & Co., Clydesdale Works, 50 Victoria Road, Glasgow,	1 gallon	50

Name of Dip	Name and Address of Manufacturer or Proprietor	Proportion of dilution in water approved for each dip when used for Sheep Scab	
		Quantity of Dip	No. of Gallons of Water
Murtagh's Powder Dip, .	Murtagh's Medical Hall, 37 Shop Street, Drogheda.	1 lb. 14 ozs. (1 packet)	20
Mykrol Fluid Dip, .	The Mykrol Company, Queen's Ferry, Flintshire.	1 part	40 parts
Mykrol Sheep Dip, Powder, .		2 lbs. (1 packet)	18
"Nicrotine" Sheep Dip, .	The British Nicotine Company, Ltd., Bootle, Liverpool.	1 part	32 parts
"Nicotina" Sheep Dip, .	Messrs. Corry & Co., Ltd., 13 and 15 Finsbury Street, London, E.C.	1 gallon	50
"Niquas" Sheep Dip, .	Messrs. Alex. Robertson & Sons, Argyle Chemical Works, Oban, N.B.	1 gallon	35
Non-Poisonous Paste "Highland" Sheep Dip, .		1 lb.	5
Non-Poisonous Sheep Dip, .	Messrs. Kerr, Lang & Jackson, Ltd., Londonderry.	1 lb.	5
Odams' Powder Dip, .	Odams' Manure and Chemical Co., Ltd., 109 Frenchchurch Street, London.	2 lbs.	20
Odams' Fluid Dip, .		1 part	50 parts
"Ovizal" Fluid Sheep Dip, .		1 gallon	100
"Ovizal" Paste Dip, .		1 lb.	5
"Ovizal" Powder Dip, .	Hay, Steven & Co. Kelvinlock Chemical Works, Maryhill, near Glasgow.	6 packets of Dip (each containing 1 lb. 14 ozs. of powder)	100
Pettifer Powder Dip, .	Messrs. Stephen Pettifer & Sons, Crudwell Chemical Establishment, Malmesbury, Wilts.	1 lb. 14 ozs.	20
Poisonous Paste "Highland" Sheep Dip, .	Messrs. Alex. Robertson & Sons, Argyle Chemical Works, Oban, N.B.	1 lb.	5
Powder Dip (Poison), .	Messrs. B. B. Harescough & Co., Ltd., Chemical Works, Skipton.	2 lbs.	25
Puritas Sheep Dip (Cold Water Quality),		1 part	100 parts
Puritas Sheep Dipping Powder,		2 lbs.	20
Puritas Sheep Dipping Fluid,		1 part	50 parts
Puritas Concentrated Liquid Sheep Dip,	Puritas Disinfectants Co., Ltd., Evington Valley Road, Leicester.	1 part	80 parts
Puritas Golden Paste Sheep Dip,		5 lbs.	40
Puritas Sheep Dip (Hot Water Quality),		1 part	50 parts
Puritas Dressing Dip for Sheep,		7 lbs.	40
Puritas Fly Sheep Dip, .		5 lbs.	40
Quibell's Combined Paste Dip (Arsenical and Carbolic),		1 lb.	5
Quibell's Improved (Non-Poisonous) Liquid Sheep Dip,		1 gallon	100
Quibell's Liquid Sheep Dip,		1 gallon	40
Quibell's Non-Poisonous Paste or Cake Dip,	Quibell Brothers Limited, Newark, England.	5 lbs.	25
Quibell's Powder Sheep Dip,		30 ozs.	20
Quibell's Special (Non-Poisonous) Liquid Sheep Dip,		1 gallon	85
Robinson's Sheep Dip, .	Robinson Brothers, Ltd., West Bromwich, Staffordshire.	1 part	80 parts
"Rome's Sheep Bath," .	H. F. Rome, Manufacturing Chemist, 1 and 3 Salway Street, Annan, N.B.	26 ozs.	42
Santifer Sanitary Fluid, .	Messrs. Stephen Pettifer & Sons, Crudwell Chemical Establishment, Malmesbury, Wilts.	1 gallon	60

Name of Dip	Name and Address of Manufacturer or Proprietor	Proportion of dilution in water approved for each dip when used for Sheep Scab	
		Quantity of Dip	No. of Gallons of Water
Scottish Chemical Company's Liquid Dip,	The Scottish Chemical Co., Ltd., 43 Wellington St., Greenock,	1½ gallons	100
Scottish Chemical Company's Paste Dip,		15 lbs.	100
Scott's Sheep Dip,	Scott & Dunn, Westbarns, Dunbar, Scotland,	1 part	35 parts
Sheep Dipping Composition (Paste),	Messrs. Stephen Pettifer & Sons, Crudwell Chemical Establishment, Mahnesbury, Wilts,	1½ lbs.	15
Sivelle's Sheep Dip,	John Levis, M.P.S.I., Skibbereen,	1 gallon	100
Snowdal Sheep Dip,	Snowdon, Sons & Co., Limited, Millwall, London, E.,	1 gallon	40
Special Fly Dip,	The North of Ireland Chemical Co., Ltd., Belfast,	14 lbs.	90
Special " Highland " Fly Dip,	Messrs. Alex. Robertson & Sons, Argyll Chemical Works, Oban, N.B.,	1 lb.	5
Stafford's Powder Sheep Dip,	George Stafford, John Street, Wexford,	30 ozs.	20
" Sular " Sheep Dip,	The Chemical Union, Ltd., Ipswich,	2 lbs.	16
" Tarbol " Sheep Dip,		1 gallon	50
Taylor's Powder Dip,	H. Taylor, Druggist, Tinalhly,	1 lb 14 ozs. (1 packet)	20
Torren's Instantaneous Sheep Dipping Fluid,	J. M. Torrens, M.P.S.I., North Main Street, Youghal,	1 gallon	80
" Tynedale " Sheep Dip,	John Ridley, Hexham Chemical Works, Hexham-on-Tyne,	5 10 lbs.	60
The " Universal " Sheep Dipping Powder,	The North of Ireland Chemical Co., Ltd., Belfast,	2 lbs.	20
Visanus Sheep Dip,	The Visanus Company, 14 Waterloo Lane, Glasgow,	1 gallon	50
Watson's Fluid Sheep Dip (Non-Poisonous),	C. Watson, 294 Washwood Heath Road, Birmingham,	1 part	60 parts
" Wells' Dipping Compound " Sheep Dip,	W. F. Wells & Son, 52 Upper Sackville Street, Dublin,	1 gallon	80
Whelan's Powder Dip,	John M. Whelan, The Medical Hall, Galway,	1½ lb. 14 ozs. (1 packet)	20
White's Non-Poisonous Sheep Dip,	P. N. White, Chemist, Sligo,	10 lbs.	50

NOTES AND MEMORANDA.

A meeting of the Agricultural Board was held at the offices of the Department, Upper Merrion Street, Dublin, on Thursday, the 6th July. The following were present :—The Right Hon. T. W. Russell, P.C., Vice-President of the Department, in the chair; Mr. Robert Downes, J.P.; Colonel Sir Nugent Everard, Bart., H.M.L.; Sir Josslyn Gore Booth, Bart., D.L.; Mr. John S. F. McCance, J.P.; Mr. William M'Donald, J.P.; The Right Hon. Lord Monteagle, K.P., D.L.; Mr. H. de F. Montgomery, D.L.; Mr. George Murnaghan, J.P.; and Mr. P. J. O'Neill, J.P.

His Grace the Most Rev. John Healy, D.D., Lord Archbishop of Tuam; the Most Rev. Denis Kelly, D.D., Lord Bishop of Ross; and the Very Rev. Canon Daly, D.D., were unavoidably prevented from attending the meeting.

Mr. T. P. Gill, Secretary of the Department; Mr. J. S. Gordon, B.Sc., Chief Agricultural Inspector; Mr. R. Cantrell, I.S.O., Chief Clerk; Mr. T. Butler, Superintendent of the Statistics and Intelligence Branch; Mr. J. P. Walsh, Clerk in Charge of Accounts; Mr. J. D. Daly, M.A. (who acted as Secretary to the meeting); and Mr. J. V. Coyle were also present.

The Board had under consideration the following county and other schemes for the year 1911-12, as revised in the light of the experience gained by the County Committees during the past year, and as regards the live stock schemes, in consultation with the Advisory Committees :—live stock, agricultural instruction, agricultural classes, poultry-keeping, butter-making, horticulture and bee-keeping, cottage and farm prizes, subsidies to shows, flax cultivation.

Provision was made for the maintenance, during the coming year, of the agricultural stations and schools working in connection with the Department, and for the instruction of girls at schools of rural domestic economy. Arrangements were made for the continuance of Agricultural Scholarships at the Royal College of Science, and for the maintenance of the Department's Forestry Stations.

The following, among other matters, were also under consideration :—Special schemes in Congested Districts, special investigations (flax, barley, wheat, oats, tobacco, early potatoes, etc), seed testing and plant diseases, the marketing of Irish produce, the working of the Fertilisers and Feeding Stuffs Act, the Food and Drugs Acts, the Destructive Insects and Pests Acts, and the Weeds and Seeds Act, and the detection of frauds on agricultural produce in Great Britain.

A meeting of the Board of Technical Instruction was held on Wednesday, the 5th July, at the offices of the Department, Upper Merrion Street, Dublin. The following were present :—The Right Hon. T. W. Russell, P.C., Vice-President of the Department, in the chair ; Mr. James Crozier, J.P., V.S. ; Mr. Alexander Dickson ; Mr. Thomas Donnellan ; Mr. Christopher J. Dunn, J.P. ; Mr. John Good ; Mr. J. A. Glynn, B.A. ; Sir James Henderson, A.M., D.L. ; Mr. William Macartney, J.P. ; Alderman Samuel T. Mercier, J.P. ; Mr. Thomas Power ; Mr. Richard Sisk ; and Mr. Alexander Taylor.

Mr. T. P. Gill, Secretary of the Department ; Mr. George Fletcher, F.G.S., Assistant Secretary in respect of Technical Instruction ; Mr. T. Butler, Superintendent of the Statistics and Intelligence Branch ; Mr. A. Vickers Dixon, Senior Inspector for Technical Instruction ; Mr. J. P. Walsh, Clerk in charge of Accounts ; Mr. J. D. Daly, M.A. (who acted as Secretary to the meeting) ; and Mr. A. Kelly, were also present.

Technical Instruction schemes in respect of the Session 1911-12 for the following Urban and County areas were considered :—*Urban Districts* : Athlone, Banbridge, Coleraine, Enniscorthy, Lurgan (Municipal scheme), Lurgan (Convent scheme), Portadown, Tipperary (Joint Urban and Rural), Wexford. *Counties* : Antrim, Cork, King's County, Limerick, Longford, Meath, Monaghan, Queen's County, Tipperary (North Riding), Wicklow.

The schemes were approved, and the Board concurred in the allocation of grants in aid thereof from the funds of the Department. The Board had also under consideration the following matters : Summer courses for teachers ; building grants for Technical Schools ; provision for the maintenance of the Irish Training School of Domestic Economy, for the Killarney School of Housewifery, for Higher Schools of Domestic Economy, and for Commercial Scholarships.

In the forenoon members of the Board visited the Royal College of Science and the Industrial Annexe, Grand Canal Bank, the Kevin Street Technical Schools, and the Metropolitan School of Art, at which Summer Courses for teachers are at present being conducted.

The second of this year's series of Surprise Butter Inspections conducted by the Department of Agriculture and Technical Instruction for Ireland was held on the 11th May. The judges were butter merchants of Cardiff and Leith.

Exhibits were received from seventy-six creameries. The marks

awarded to each exhibit for (1) flavour, (2) texture, (3) colour, (4) packing and finish, as well as the percentage of water contained in the butter, are given in the Schedule of Results issued by the Department. The names of the following Creameries are mentioned in the Schedule as having obtained the highest awards at the Inspection :—

<i>Name of Creamery.</i>				<i>Position awarded.</i>
Moneymore Co-operative Agri. and Dairy Soc., Ltd.				1
Kinlough	do.	do.	..	2
Castlechale	do.	do.	..	3
Lagan	do.	do.	..	*3
Centenary Co-operative Creamery Co., Ltd.				5
Kilmacon Co-operative Dairy Society, Ltd.				5
Glenwilliam	do.	do.	..	7
Irvinstown Co-operative Agri. and Dairy Soc., Ltd.				7
Kilmaetramny	do.	do.	..	7
Brosna	do.	do.	..	10
Finn Valley	do.	do.	..	10
St. Joseph's Creamery (Golden Vein Dairy Co.)				10
Belleek Co-operative Agri. and Dairy Soc., Ltd.				13
Bunkay Bridge Creamery (Co-operative Wholesale Soc., Ltd.)				13
Kantoher Co-operative Agri. and Dairy Soc., Ltd.				13
Mitchelstown Creamery (Newmarket Dairy Co. Ltd.)				13
Drumcliff Co-operative Agricultural and Dairy Soc., Ltd.				17
Drumholm	do.	do.	..	17
Effin	do.	do.	..	17
Inch Co-operative Dairy Society, Ltd.				17

The name of each of the remaining Creameries is entered only on the copy of the Schedule sent to the Creamery.

The objects of this scheme are to increase the number and to improve the quality of Irish Draught Horses. For the purpose of accomplishing this the scheme provides as follows :—

**Irish Draught
Horses Scheme**

1. For the registration of mares of the Irish draught type, and for the award of prizes in respect thereof.
2. For the registration of stallions of the approved Irish draught type.

3. For the award of premiums to a limited number of registered fillies out of mares entered in the register and retained for service by an approved registered Irish draught stallion.
4. For the purchase by the Department of colts out of mares entered in the Register and got by registered Irish draught stallions.
5. For the free service of registered mares by approved registered Irish draught stallions.

The scheme was put into operation in February last. With the view to selecting mares for the purposes of the scheme, the Department fixed throughout the country sixty centres. There were 5,040 mares inspected, of which 263 were ultimately selected as eligible for registration. The owner of each selected mare was paid a prize of £5. During the course of their work the judges also inspected over 100 stallions purporting to be of Irish draught type. Thirteen were approved for registration in connection with the scheme. These are located as follows: two in County Kilkenny, and one each in Counties Down, Monaghan, Westmeath, Kildare, Queen's, Carlow, Wexford, Tipperary, Cork, Limerick, and Clare. In accordance with the provisions of the scheme the Department have arranged to refund the amount of the service fee, and the cost of sending for service, by a registered Irish draught stallion, each mare entered in the register. Of the number of mares selected for registration, 246 have been or will be sent to the thirteen stallions for service.

A recent daily Consular and Trade Report issued by the Bureau of Manufacturers, Department of Commerce and Labor, United States, gives information with regard to some of the industries of Switzerland. The peculiar feature of the Swiss industrial system

one which enters seriously into the economic conditions of the confederation—is what is known as the house industry, *i.e.*, the production of various articles of manufacture in the homes of the workmen. The importance of this particular branch of industry is due to the fact that it involves the relation of cheap labour to mechanical production.

Most of the work is done by country people and residents of villages, who are engaged in farm work or other occupation during the Spring, Summer and Autumn, but who spend the Winter months in the production of various articles—the material for which is furnished by the manufacturers, who receive and pay for the finished products a stipulated price by piece or by measurement. Although machinery on a large scale is gradually eliminating the house industry

the latest statistics show that there are still about 130,000 people in Switzerland engaged in this method of manufacture. The proportion of workmen thus employed in the various branches of industry is as follows :—

Textiles	39 per cent.
Watches and Jewellery	24 „
Clothing	10 „
Straw Braids	56 „
Wood Carving	52 „

The figures show that more than half the people occupied in the straw braid and wood carving trades are classed as house workers.

The manufacture of embroideries is the most important industry in Switzerland. Almost the entire population of the Canton of St. Gall and a portion of the cantons of Thurgau and Appenzell are dependent upon the business—about 75,000 persons being employed in the production of embroideries and in allied industries. The introduction of improved automatic embroidery machines has now become general, and the machines are being installed in many of the St. Gall factories, with the result that the capacity for production is increased from 20 to 25 per cent. These automatic machines are seriously affecting the hand and house industry, their mechanism and adjustment being so perfect that they produce embroideries in some respects superior to the hand-made article; but of course their chief merit is that they reduce the cost of production and thereby increase the profits of business.

There is, however, some apprehension on the part of the manufacturers that the increase in the number of machines may result in over-production, and a consequent reduction in the price of embroidery.

St. Gall embroideries found such active markets in the early part of 1910 that a year of unexampled prosperity was confidently looked for. So far as the volume of business was concerned the expectation was fully realised, the export having been greater than ever before. The profits of the individual manufacturers, however, were not proportionately large, except in the case of those who had the wisdom to anticipate the almost world-wide demands for novelties in the better qualities of merchandise. The vast quantity of the cheap and ordinary products of the machine embroiderers brought about such keen price-cutting competition in this class of goods as to greatly lessen the general benefits of the year's extraordinary activity. There was a falling off in the trade with America, but this was more than set off by largely increased orders from Germany, Canada, England, South America and Argentina,

The reasons for the largely increased export are found in the improved machinery, the enlarged and admirable sales organisations of the exporters, and the attention given to the manufacture of novelties and special articles.

The President of the Industrie-Verein, in his recently issued annual report estimated the value of embroidery exports from Switzerland as over £8,000,000, an increase of over £600,000 on the year 1909. In St. Gall there are over 7,000 power machines in constant operation, and in addition to all these power machines there are still in existence nearly 20,000 hand machines. Many of these, however, have been idle during the past year, and in all probability the hand embroidery machine in the course of a few years will share the same fate as the old handloom, and give place altogether to the modern power machine.

The manufacture of handkerchiefs has been gradually assuming increasing importance ever since 1906. Large quantities of Irish linen in bolts imported into St. Gall, coming in free of duty, are made into handkerchiefs, and sent back to Belfast, where they are bleached and exported to the United States. Other large quantities of muslin handkerchiefs in the grey are exported to the United States, where they are hemstitched and bleached, of course being entered at comparatively low rates of duty.

Switzerland exported Condensed Milk last year to the value of £1,200,000 as compared with £1,100,000 in 1909. It appears that England is the largest purchaser of the Swiss product, but many of the exports credited to Great Britain are re-exported. In recent years the interests of the Continental Swiss milkmakers have been combined under the name of the Nestle-Anglo-Swiss Condensed Milk Co., and operated under one general management, which has given the company almost a complete monopoly of the business in England and Europe generally, where they have a number of factories.

STATISTICAL

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned
compared with the

—	North Coast.				East Coast.			
	1911.		1910.		1911.		1910.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	—	—	—	—	25	44	14	28
Soles,	2	9	—	—	113	451	94	369
Turbot,	—	—	—	—	55	224	30	127
Total Prime Fish, . .	2	9	—	—	193	719	138	524
Cod,	17	13	38	23	1,436	996	1,041	649
Conger Eel,	—	—	—	—	659	284	617	209
Haddock,	12	6	52	21	857	525	585	520
Hake,	—	—	—	—	920	777	742	539
Herrings,	—	—	—	—	—	—	21	7
Ling,	—	—	—	—	574	257	—	—
Mackerel,	—	—	—	—	—	—	272	131
Plaice,	334	333	243	316	521	550	903	906
Ray or Skate,	142	33	132	34	742	353	986	244
Sprats,	—	—	—	—	—	—	—	—
Whiting,	—	—	—	—	744	581	765	563
All other except Shell Fish	110	19	39	12	422	260	1,025	515
Total,	617	413	504	406	7,068	5,302	7,095	4,837
SHELL FISH :—	No.	—	No.	—	No.	—	No.	—
Crabs,	3,036	38	2,472	9	3,935	15	2,468	7
Lobsters,	876	22	777	21	3,987	184	3,213	137
Mussels,	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
Oysters,	No.	—	No.	—	80	5	124	9
Other Shell Fish, . .	Cwts.	—	Cwts.	—	32,823	58	3,717	7
Total,	—	60	—	30	439	199	401	154
Total value of Fish landed	—	473	—	436	—	5,763	—	5,151

NOTE.—The above figures are subject

TABLES.

IRELAND.

as Landed on the Irish Coasts during the month of April, 1911,
corresponding period in 1910.

South Coast.				West Coast.				Total.			
1911.		1910.		1911.		1910.		1911.		1910.	
Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
—	—	5	12	2	4	—	—	27	48	19	40
33	145	29	130	72	310	76	321	220	915	199	820
—	—	6	24	17	88	14	61	72	312	50	212
33	145	40	166	91	402	90	382	319	1,275	268	1,072
11	11	15	11	759	252	806	215	2,223	1,272	1,900	898
—	—	3	1	24	7	6	1	683	291	626	211
5	4	27	20	344	215	305	184	1,218	750	969	745
—	—	—	—	—	—	20	7	920	777	762	546
—	—	38	13	50	13	427	77	50	13	486	97
—	—	12	7	170	50	161	57	744	307	173	64
5,104	1,677	15,509	4,692	2,659	1,244	6,281	2,048	7,763	2,921	21,062	6,871
102	106	123	121	145	137	159	262	1,102	1,126	1,428	1,605
21	5	19	3	39	9	27	5	944	400	1,164	286
—	—	—	—	—	—	—	—	—	—	—	—
103	33	193	56	139	55	56	19	986	669	1,014	638
114	72	89	51	335	208	256	112	981	559	1,409	720
5,493	2,053	16,068	5,141	4,755	2,592	8,594	3,369	17,933	10,360	32,261	13,753
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
216	11	541	27	1,464	69	2,969	110	6,971	53	4,940	16
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	286	Cwts.	295
—	—	—	—	40	6	—	—	120	11	124	9
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
5,292	11	4,284	9	—	—	—	—	38,115	69	8,001	16
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
277	36	345	57	523	109	554	112	1,239	344	1,300	323
—	58	—	93	—	184	—	222	—	763	—	659
—	2,111	—	5,234	—	2,776	—	3,591	—	11,123	—	14,412

to correction in Annual Returns.

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the Fish returned compared with the

—	North Coast.				East Coast.			
	1911.		1910.		1911.		1910.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	—	—	—	—	25	42	23	40
Soles,	12	59	6	32	106	410	87	360
Turbot,	—	—	—	—	61	255	27	123
Total Prime Fish, . .	12	59	6	32	192	707	137	523
Cod,	349	81	438	134	990	749	988	629
Conger Eel,	1	1	—	—	720	330	623	242
Haddock,	45	22	62	30	800	566	719	550
Hake,	—	—	—	—	714	562	803	583
Herrings,	20,608	12,009	38,394	15,759	767	307	2,420	689
Ling,	—	—	207	35	620	303	272	115
Mackerel	420	59	603	75	—	—	—	—
Plaice,	521	588	310	340	689	718	655	654
Ray or Skate,	119	28	106	34	745	363	817	201
Sprats,	—	—	—	—	—	—	—	—
Whiting,	—	—	—	—	908	726	1,084	624
All other except Shell Fish	95	99	837	156	529	291	983	513
Total,	22,170	12,946	40,963	16,595	7,764	5,622	9,531	5,323
SHELL FISH:—	No.		No.		No.		No.	
Crabs,	11,832	58	7,464	38	14,908	60	12,313	32
Lobsters,	3,185	92	3,732	122	7,095	285	7,522	313
	Cwts.		Cwts.		Cwts.		Cwts.	
Mussels,	—	—	—	—	80	2	63	4
	No.		No.		No.		No.	
Oysters,	—	—	—	—	—	—	—	—
	Cwts.		Cwts.		Cwts.		Cwts.	
Other Shell Fish, . .	—	—	—	—	335	149	362	138
Total,	—	150	—	160	—	496	—	487
Total value of Fish landed	—	13,096	—	16,755	—	6,118	—	5,810

NOTE.—The above figures are subject

IRELAND.

as landed on the IRISH COASTS during the month of May, 1911, as
corresponding period in 1910.

South Coast.				West Coast.				Total.			
1911.		1910.		1911.		1910.		1911.		1910.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
2	4	6	13	2	3	3	4	29	49	32	57
33	153	36	162	35	147	83	368	186	769	212	922
—	—	8	33	19	76	20	75	80	331	55	231
35	157	50	208	56	226	106	447	295	1,149	299	1,210
85	68	64	34	77	24	50	25	1,501	922	1,540	822
—	—	—	—	33	13	2	2	754	344	625	244
15	15	22	13	123	68	206	108	983	671	1,039	701
—	—	—	—	—	—	—	—	714	562	803	583
3,088	650	3,146	603	1155	351	328	119	25,618	13,317	44,288	17,170
66	53	49	23	77	27	37	12	763	383	565	185
17,854	2,882	28,830	6,270	25,128	5,080	21,471	4,989	43,402	8,021	50,904	11,334
133	164	151	179	119	100	118	110	1,462	1,570	1,234	1,283
11	3	3	2	100	19	22	6	975	413	948	243
—	—	—	—	—	—	—	—	—	—	—	—
136	31	79	16	57	25	62	28	1,191	782	1,225	666
122	69	199	102	269	183	446	204	1,015	642	2,465	975
21,545	4,092	32,593	7,450	27,194	6,116	22,848	6,048	78,673	28,776	105,935	35,416
No.	3	No.	4	No.	1	No.	1	No.	122	No.	75
300	—	397	—	349	—	228	—	27,485	—	20,402	—
2,578	116	2,237	91	5,628	195	8,071	279	18,486	688	21,562	805
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
—	—	—	—	—	—	—	—	80	2	63	4
No.	—	No.	5	No.	—	No.	—	No.	—	No.	5
—	—	2,394	—	—	—	—	—	—	—	2,394	—
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
212	22	250	25	842	213	626	106	1,389	384	1,238	269
—	141	—	125	—	409	—	386	—	1,196	—	1,158
—	4,233	—	7,575	—	6,525	—	6,434	—	29,972	—	36,574

to correction in Annual Returns.

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

	North Coast.				East Coast.			
	1911.		1910.		1911.		1910.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	—	—	—	—	18	46	6	15
Soles,	14	72	9	41	90	199	44	188
Turbot,	—	—	—	—	56	175	25	114
Total Prime Fish, .	14	72	9	41	164	420	75	317
Cod,	3	1	—	—	959	649	897	491
Conger Eel,	—	—	—	—	698	293	684	210
Haddock,	13	8	26	12	787	511	840	551
Hake,	—	—	—	—	793	582	843	509
Herrings,	535	225	307	209	10,816	3,936	12,385	4,058
Ling,	—	—	—	—	669	302	267	114
Mackerel,	—	—	—	—	201	59	179	28
Plaice,	339	313	384	350	507	517	441	450
Ray or Skate, . . .	23	5	51	12	693	329	860	188
Sprats,	—	—	—	—	—	—	—	—
Whiting,	—	—	6	4	945	677	1,039	648
All other except Shell Fish	7	7	80	25	577	342	1,029	533
Total,	934	631	863	653	17,809	8,617	19,539	8,157
SHELL FISH:—	No.		No.		No.		No.	
Crabs,	8,829	29	7,356	25	10,423	24	12,460	53
Lobsters,	4,451	141	5,942	188	10,479	383	6,735	290
	Cwts.		Cwts.		Cwts.		Cwts.	
Mussels	—	—	—	—	40	1	32	3
	No.		No.		No.		No.	
Oysters,	—	—	—	—	—	—	—	—
	Cwts.		Cwts.		Cwts.		Cwts.	
Other Shell Fish . .	—	—	—	—	276	139	234	133
Total,	—	170	—	213	—	547	—	479
Total value of Fish landed	—	801	—	866	—	9,164	—	8,636

NOTE.—The above figures are subject

IRELAND.

as landed on the IRISH COASTS during the month of June, 1911, as corresponding period in 1910.

South Coast.				West Coast.				Total.			
1911.		1910.		1911.		1910.		1911.		1910.	
Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
5	11	3	5	6	12	8	16	29	69	17	36
55	168	30	138	140	342	66	299	299	781	149	666
4	17	5	18	31	104	16	69	91	296	46	201
64	196	38	161	177	458	90	384	419	1,146	212	903
92	51	83	46	9	2	17	11	1,063	703	997	548
14	12	54	32	38	8	15	8	750	313	753	250
22	20	19	11	119	78	198	95	941	617	1,083	669
4	4	16	10	—	—	31	12	797	586	890	591
6,330	1,866	4,353	1,123	33	11	38	15	17,714	6,038	17,083	5,405
144	61	121	48	18	10	19	10	831	373	407	172
5,719	1,055	18,513	3,701	4668.	1,111	36,891	8,101	10,588	2,225	55,583	11,830
206	238	137	161	187	205	160	149	1,239	1,273	1,122	1,110
3	1	6	1	94	17	12	4	813	352	929	205
10	2	100	14	—	—	—	—	10	2	190	14
88	27	68	17	249	103	378	94	1,282	807	1,491	763
201	95	170	106	494	419	545	273	1,279	863	1,824	937
12,897	3,628	23,678	5,431	6,086	2,422	38,394	9,156	37,726	15,298	82,474	23,397
No. 2,072	18	No. 1,879	19	No. 670	3	No. 466	2	No. 21,994	74	No. 22,161	99
24,888	907	19,443	639	25,898	862	33,779	1,007	65,716	2,293	65,899	2,124
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	40	Cwts.	32
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
275	36	180	18	299	57	555	92	850	232	969	243
—	961	—	676	—	922	—	1,101	—	2,600	—	2,469
—	4,589	—	6,107	—	3,344	—	10,257	—	17,898	—	25,866

to correction in Annual Returns.

STATEMENT of the TOTAL QUANTITY of FISH landed on the ENGLISH and WELSH COASTS during the Month and Six Months ended 30th June, 1911, compared with the corresponding Periods of the Year 1910.

	June.		Six months ended 30th June.	
	1911.	1910.	1911.	1910.
QUANTITY.				
Brill,	1,360	1,175	7,692	7,751
Soles,	5,388	4,835	32,232	29,596
Turbot,	5,196	4,079	22,909	24,642
Prime Fish not separately distinguished,	541	533	1,506	2,071
Total Prime Fish,	12,485	10,622	64,339	64,060
Bream,	4,118	4,015	20,671	21,402
Catfish,	13,823	10,632	36,527	32,114
Coalfish,	18,680	16,830	173,297	159,263
Cod,	233,162	236,906	1,492,496	1,359,305
Conger Eels,	4,260	3,296	23,322	19,247
Dabs,	6,688	8,509	41,708	58,362
Dogfish,	1,108	1,066	12,714	12,118
Dory,	152	101	840	949
Flounders or Flukes,	448	218	5,013	2,969
Gurnards,	7,506	9,401	47,739	46,371
Haddock,	174,428	174,452	939,457	881,779
Hake,	111,944	106,367	389,505	421,081
Halibut,	16,263	18,600	70,892	68,566
Latchets (Tubs),	333	308	1,776	1,374
Lemon Soles,	7,416	7,032	27,110	24,276
Ling,	16,087	18,814	97,639	100,541
Megrims,	9,543	9,881	57,382	54,647
Monks (or Anglers),	2,846	2,649	19,087	17,519
Mullet (Red),	1	5	318	312
Plaice,	107,868	105,319	524,121	478,623
Pollack,	1,731	1,326	16,758	15,027
Skates and Rays,	34,210	32,062	175,376	178,453
Torsk,	1,619	1,157	7,871	5,991
Whiting,	16,095	21,570	152,359	173,697
Witches,	1,265	2,451	15,579	24,193
Herrings,	77,261	141,241	142,436	214,404
Mackerel,	38,959	67,014	267,551	335,588
Mullet (Grey),	42	42	447	732
Pilchards,	30	64	70	132
Sprats,	—	—	31,838	27,676
Whitebait,	693	934	3,540	3,761
Fish not separately distinguished,	26,920	27,664	194,523	197,055
Total,	947,984	1,040,648	5,054,211	5,002,567
Shell :—	No.	No.	No.	No.
Crabs,	634,343	577,337	3,483,988	3,408,518
Loysters,	102,634	70,763	305,221	264,952
Oysters,	374,853	495,340	5,610,067	7,866,491
	Cwts.	Cwts.	Cwts.	Cwts.
Other Shell Fish,	23,242	23,065	187,018	192,341

NOTE.—The figures for 1911 are subject to correction.

STATEMENT of the TOTAL VALUE of FISH landed on the ENGLISH and WELSH COASTS during the Month and Six Months ended 30th June, 1911, compared with the corresponding Periods of the Year 1910.

	June.		Six months ended 30th June.	
	1911.	1910.	1911.	1910.
	VALUE.			
	£	£	£	£
Brill,	3,912	3,508	25,598	25,526
Soles,	31,671	30,705	204,984	198,665
Turbot,	17,782	15,673	105,470	121,198
Prime Fish not separately distinguished,	841	831	2,383	3,030
Total Prime Fish,	54,206	50,717	338,435	348,419
Bream,	870	751	7,004	8,044
Cattfish,	3,144	3,047	14,262	15,861
Coalfish,	3,435	2,668	41,792	32,842
Cod,	65,896	75,629	740,839	660,148
Conger Eels,	2,107	2,119	17,163	15,472
Dabs,	3,648	4,216	30,758	43,345
Dogfish,	427	325	3,443	3,502
Dory,	146	93	924	955
Flounders or Flukes,	213	139	2,419	1,871
Gurnards,	1,805	2,059	12,900	13,599
Haddock,	84,102	80,152	636,277	583,234
Hake,	60,449	68,451	290,865	307,940
Halibut,	33,784	31,607	182,392	170,393
Latchetts (Tubs),	204	137	1,034	828
Lemon Soles,	11,900	10,321	58,697	55,291
Ling,	5,429	6,894	40,975	42,493
Megrim,	4,170	5,068	36,688	37,523
Monks (or Anglers),	830	1,038	7,558	7,907
Mullet (Red),	5	19	894	966
Plaice,	79,282	75,016	457,032	432,375
Pollack,	425	602	7,416	7,131
Skates and Rays,	15,815	17,224	100,359	115,814
Torsk,	484	612	4,200	3,346
Whiting,	7,592	8,784	83,815	94,654
Witches,	1,210	2,483	19,487	30,536
Herrings,	24,600	30,324	47,041	53,732
Mackerel,	18,085	26,941	130,609	155,035
Mullet (Grey),	132	103	959	1,200
Pilchards,	10	31	30	46
Sprats,	—	—	5,103	4,522
Whitebait,	1,356	1,774	7,103	6,947
Fish not separately distinguished,	13,583	16,007	92,230	99,039
Total,	499,344	525,349	3,420,703	3,355,050
Shell Fish :—				
Crabs,	8,323	7,287	33,905	33,024
Lobsters,	4,830	3,352	14,969	12,823
Oysters,	674	876	14,617	23,382
Other Shell Fish,	8,820	8,543	48,362	47,147
Total,	22,647	20,058	111,853	116,376
Total value of all Fish,	521,991	545,407	3,532,556	3,471,426

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as landed on the SCOTTISH COASTS during the Month and Six Months ended 30th June, 1911, compared with the corresponding periods of the Year 1910.

	June.		Six Months ended 30th June.	
	1911.	1910.	1911.	1910.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Herrings,	1,347,079	1,822,878	2,175,170	2,813,157
Sprats,	—	—	3,288	832
Sparlings,	—	7	48	116
Mackerel,	1,597	2,835	12,295	11,108
Cod,	98,954	92,580	632,311	622,447
Ling,	23,863	31,240	116,712	126,497
Torsk (Tusk),	2,223	1,933	12,059	10,119
Saith (Coal Fish),	18,573	19,847	108,106	114,446
Haddock,	64,724	63,679	454,405	432,543
Whiting,	11,695	13,894	70,727	75,054
Conger Eel,	334	875	27,970	20,217
Turbot,	432	452	2,361	2,382
Halibut,	7,753	7,377	27,236	23,532
Lemon Soles,	1,620	5,489	17,779	17,884
Flounders, Plaice, Brill,	3,880	5,079	29,326	32,087
Skate and Ray,	13,922	13,462	98,185	86,576
Fish not separately distinguished, except Shell Fish,	12,064	11,217	58,818	58,605
Total,	1,611,713	2,092,844	3,812,696	4,447,600
Shell Fish :—	No.	No.	No.	No.
Crabs,	256,657	280,667	1,520,820	1,432,895
Lobsters,	66,389	90,611	270,585	304,735
Oysters,	15,000	—	523,333	511,172
	Cwts.	Cwts.	Cwts.	Cwts.
Clams,	250	184	7,919	4,502
Mussels,	4,678	3,631	44,691	42,107
Other Shell Fish,	2,716	3,169	26,409	26,467
VALUE.				
	£	£	£	£
Herrings,	331,723	418,218	465,806	654,459
Sprats,	—	—	530	191
Sparlings,	—	32	131	348
Mackerel,	328	562	3,565	3,454
Cod,	29,782	33,615	231,232	240,718
Ling,	6,166	9,578	37,108	40,994
Torsk (Tusk),	414	425	3,236	2,850
Saith (Coal Fish),	1,868	2,178	15,324	16,931
Haddock,	28,965	32,778	253,011	266,519
Whiting,	3,768	4,927	30,936	35,097
Conger Eel,	142	441	9,562	8,088
Turbot,	1,028	1,186	7,626	8,345
Halibut,	12,326	11,156	50,755	44,230
Lemon Soles,	6,395	7,284	34,784	33,695
Flounders, Plaice, Brill,	5,130	6,050	38,623	41,809
Skate and Ray,	2,010	1,789	23,529	21,143
Fish not separately distinguished except Shell Fish,	3,881	3,570	26,251	27,333
Total,	434,426	533,749	1,231,809	1,446,214
Shell Fish :—	£	£	£	£
Crabs,	1,658	1,835	10,082	9,263
Lobsters,	3,171	4,301	14,893	16,722
Oysters,	180	—	1,895	1,823
Clams,	37	28	1,045	689
Mussels,	250	173	2,209	1,860
Other Shell Fish,	903	891	6,192	6,611
Total,	6,199	7,278	36,310	36,968
Total Value of Fish landed,	440,625	541,027	1,268,125	1,483,182

NOTE.—The above figures are subject to correction in the Annual Returns.

**STATEMENT of the TOTAL QUANTITY and VALUE of the FISH
returned as landed on the IRISH COASTS during the Month and
Six Months ended 30th June, 1911, compared with the corres-
ponding periods of the Year 1910.**

	June.		Six Months ended 30th June.	
	1911.	1910.	1911.	1910.
QUANTITY				
	Cwts.	Cwts.	Cwts.	Cwts.
Brill,	29	17	210	193
Soles,	299	149	1,281	1,135
Turbot,	91	46	440	283
Total Prime Fish,	419	212	1,931	1,611
Cod,	1,063	997	17,001	15,985
Conger Eel,	750	753	4,363	3,940
Haddock,	941	1,083	10,363	9,656
Hake,	797	880	4,623	5,040
Herrings,	17,714	17,083	356,529	243,298
Lang,	831	407	4,974	3,676
Mackerel,	10,588	55,583	72,555	129,972
Plaice,	1,239	1,122	6,210	6,197
Ray or Skate,	813	929	5,301	5,731
Sprats,	10	100	94	402
Whiting,	1,282	1,491	6,636	7,733
Fish not separately distinguished, except Shell Fish,	1,279	1,824	6,249	10,150
Total,	37,726	82,474	496,829	443,391
Shell Fish :—	No.	No.	No.	No.
Crabs,	21,994	22,161	57,076	50,486
Lobsters,	65,716	65,899	101,608	102,890
Oysters,	—	—	145,398	88,943
Mussels,	Cwts.	Cwts.	Cwts.	Cwts.
Other Shell Fish,	40	32	1,766	5,407
	850	969	8,855	7,424
VALUE.				
	£	£	£	£
Brill,	69	36	377	334
Soles,	781	666	5,004	5,065
Turbot,	296	201	1,786	1,185
Total Prime Fish,	1,146	903	7,167	6,584
Cod,	703	548	9,490	8,338
Conger Eel,	313	250	1,836	1,323
Haddock,	617	689	6,135	6,025
Hake,	586	591	3,586	3,803
Herrings,	6,038	5,405	81,944	58,336
Lang,	373	172	2,301	1,369
Mackerel,	2,225	11,830	15,823	30,519
Plaice,	1,273	1,110	6,507	6,908
Ray or Skate,	352	205	2,079	1,389
Sprats,	2	14	19	81
Whiting,	807	763	4,545	4,455
Fish not separately distinguished, excepts Shell Fish,	863	937	3,592	4,571
Total,	15,298	23,397	145,030	133,501
Shell Fish :—	£	£	£	£
Crabs,	74	99	252	198
Lobsters,	2,293	2,124	3,894	3,553
Oysters,	—	—	203	527
Mussels,	1	3	197	157
Other Shell Fish,	232	243	2,559	1,770
Total,	2,600	2,469	6,905	6,205
Total Value of Fish landed,	17,898	25,866	151,935	139,706

QUARTERLY AVERAGE PRICES OF CROPS, LIVE STOCK, MEAT, PROVISIONS, &C.,
for the period ended 30th June, 1911.

PRODUCT.	PROVINCE.				IRELAND.	
	Leinster.	Munster.	Ulster.	Con-naught.	1911.	1910.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
CROPS :—						
Wheat, . . . per 112 lbs.	—	—	—	—	—	—
Oats (White) . . .	7 1	6 7½	6 4½	6 8½	6 7	6 6½
(Black) . . .	6 5½	6 2½	—	—	6 4	6 3
Barley, . . .	—	—	—	—	—	—
Potatoes . . .	4 8½	3 9½	4 2	4 0½	4 2½	3 3
Hay (Clover) . . .	4 1½	2 11½	3 2½	2 9½	3 3½	4 7
(Meadow) . . .	2 5½	1 10½	2 10½	2 1½	2 1½	3 5½
Grass Seed—						
(Perennial Rye) . . .	—	—	—	—	—	—
(Italian Rye) . . .	—	—	—	—	—	—
Flax . . . per 14 lbs.	—	—	—	—	—	—
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
LIVE STOCK :—						
Calves (young) . . . per head	2 7 6	1 14 8	2 0 7	2 13 0	2 4 0	2 2 5
" (over 6 and not exceeding 12 months) per head	6 17 0	6 8 6	5 17 1	5 15 7	6 5 1	4 19 1
Store Cattle—						
One year old and under two years . . . per head	9 9 6	8 19 3	8 4 2	8 11 2	8 16 11	7 9 6
Two years old and under three years . . . per head	12 6 5	10 13 11	10 10 4	11 2 6	11 5 4	10 2 7
Three years old and over . . .	14 8 11	12 13 4	13 13 7	13 4 11	13 5 4	12 7 3
Fat Cattle—						
Two years old and under three years . . . per head	14 19 6	15 2 6	13 17 3	14 13 0	14 9 11	13 15 4
Three years old and over . . .	17 4 8	16 2 8	15 12 5	12 13 4	16 12 2	15 18 9
Cows and Bulls . . . per head	14 2 0	12 16 10	13 13 11	14 0 10	13 5 9	—
Springers—						
Cows and Heifers . . . per head	16 7 11	14 15 10	15 7 2	15 15 0	15 10 0	14 3 1
Milch Cows (down calved) . . .	14 17 5	13 17 6	14 4 6	13 9 3	14 4 4	12 15 7
Lambs (under 12 months old) . . . per head	1 5 2	1 6 11	1 13 0	1 3 11	1 5 7	1 6 2
Store Sheep—						
One year old and under two years . . . per head	1 13 5	1 15 9	1 10 7	1 14 5	1 14 8	1 15 9
Two years old and over . . .	1 10 4	1 9 4	1 12 10	1 18 4	1 12 3	2 4 5
Fat Sheep—						
One year old and under two years . . . per head	2 1 4	2 5 1	2 1 6	2 5 3	2 3 4	—
Two years old and over . . .	2 2 8	2 7 3	2 3 11	2 8 4	2 5 4	—
Young Pigs—						
8 to 10 weeks old . . . per head	0 19 8	1 6 2	1 7 0	1 7 1	1 4 7	1 8 6
Under four months old . . .	1 13 8	1 16 9	2 4 11	1 19 11	1 16 1	—
Fat Pigs . . .	3 9 11	4 0 0	4 0 0	4 19 2	4 8 0	—
Sows, . . .	5 9 4	6 4 5	5 18 8	7 10 3	6 2 3	—
MEAT, PROVISIONS, &C.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Beef (Live) . . . per 112 lbs.	—	—	—	—	35 5	38 3
(Dead) . . .	—	—	—	—	62 0	68 11
Mutton (Live) . . .	—	—	—	—	36 8	41 10
(Dead) . . .	—	—	—	—	64 2	73 2
Pork (Dead) . . .	52 6	54 5	53 0	52 5	54 3	61 3
Butter (Creamery) . . .	105 5	101 9	—	—	101 10	104 10
" (Factory) . . .	88 0	86 9	—	—	86 10	95 8
" (Farmers) . . .	88 9	85 11	90 9	87 10	86 10	94 0
Eggs . . . per 120	7 7½	7 7	—	6 7½	7 4	6 11½
Wool . . . per lb.	0 10½	0 10½	—	0 10½	0 10½	0 10½

WEEKLY AVERAGE PRICES of WHEAT, OATS, and BARLEY, per 112 lbs., computed from Market Returns of certain quantities of these Cereals supplied by Officers of Customs and Excise, during the QUARTER ended 30th June, 1911.

Returns received in the Week ended		WHEAT.		OATS.		BARLEY.	
		Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.
1911.		s. d.	Cwts. of 112 lbs.	s. d.	Cwts. of 112 lbs.	s. d.	Cwts. of 112 lbs.
April,	1	—	—	6 2	2,655	—	—
"	8	—	—	6 4	2,688	—	—
"	15	—	—	6 5	2,412	—	—
"	22	—	—	6 4	3,688	—	—
"	29	—	—	6 3½	2,807	—	—
May,	6	—	—	6 3½	3,694	—	—
"	13	—	—	6 4½	3,184	—	—
"	20	—	—	6 7½	2,213	—	—
"	27	—	—	6 9½	2,351	—	—
June,	3	—	—	7 1½	1,701	—	—
"	10	—	—	6 10½	1,702	—	—
"	17	—	—	6 10½	2,218	—	—
"	24	—	—	6 8½	2,634	—	—

QUARTERLY AVERAGE PRICES of FAT CATTLE and FAT SHEEP, per 112 lbs., LIVE WEIGHT, sold in DUBLIN MARKETS during the period ended 30th June, 1911, and also for the corresponding period during fourteen preceding years.

Year.	Fat Cattle.			Fat Sheep.			Year.
	£	s.	d.	£	s.	d.	
1911,	1	15	5	1	16	8	1911.
1910,	1	18	3	2	1	0	1910.
1909,	1	14	9	1	14	4	1909.
1908,	1	14	10	2	2	3	1908.
1907,	1	14	0	2	2	8	1907.
1906,	1	12	6	2	2	10	1906.
1905,	1	12	9	1	19	9	1905.
1904,	1	14	3	2	0	7	1904.
1903,	1	14	5	2	0	4	1903.
1902,	1	17	4	1	17	0	1902.
1901,	1	13	4	1	18	0	1901.
1900,	1	14	11	2	0	1	1900.
1899,	1	13	7	1	16	3	1899.
1898,	1	10	7	1	14	9	1898.
1897,	1	13	3	1	17	10	1897.

NUMBER of ANIMALS included in Returns furnished under the MARKETS and FAIRS (Weighing of Cattle) ACT, 1891, Sections 3 and 4,
during the Quarter ended 30th June, 1911.

WEEK ENDED	FAT CATTLE.					FAT SHEEP.			
	Dublin.		Belfast.		Total Number of Cattle included in Returns.	Dublin.		Belfast.	Total Number of Sheep included in Returns.
	Corporation Market Authorities.	Mr. Gavin Low, Auctioneer.	Corporation Market Authorities.	Mr. John Robson, Auctioneer.		Corporation Market Authorities.	Mr. Gavin Low, Auctioneer.	Corporation Market Authorities.	
1911.									
6 . . .	72	105	50	32	259	—	262	—	262
13 . . .	75	102	50	41	298	—	150	—	150
20 . . .	76	87	50	30	243	—	214	—	214
27 . . .	67	105	50	35	257	—	273	—	273
4 . . .	78	90	50	60	278	—	359	—	359
11 . . .	72	113	52	32	269	—	387	—	387
18 . . .	89	98	51	32	270	—	406	—	406
25 . . .	65	74	50	53	242	—	418	—	418
1 . . .	70	50	50	34	204	—	366	—	366
8 . . .	62	54	50	45	211	—	279	—	279
15 . . .	50	56	50	24	180	27	424	—	451
21 . . .	57	42	50	25	174	—	309	—	309
29 . . .	81	103	52	35	271	—	480	—	480
Totals,	914	1,079	655	478	3,126	27	4,327	—	4,354

DISEASES OF ANIMALS IN IRELAND.

NUMBER OF OUTBREAKS of SWINE FEVER, and NUMBER of SWINE returned as having been SLAUGHTERED in Ireland, under the Diseases of Animals Act of 1894, in the undermentioned period, by Order of the Department.

Quarter ended.	SWINE-FEVER.	
	Outbreaks confirmed.	Swine Slaughtered as Diseased or as having been Exposed to Infection.
30th June, 1911,	31	309

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been Attacked by ANTHRAX and GLANDERS in Ireland in the undermentioned period.

Quarter ended.	ANTHRAX.		GLANDERS (including Farcy).		Epizootic Lymphangitis.	
	Outbreaks Reported.	Animals Attacked.	Outbreaks Reported.	Animals Attacked.	Outbreaks Reported.	Animals Attacked.
30th June, 1911.	2	3	1	2	—	—

NUMBER of CASES of RABIES in DOGS in IRELAND during the undermentioned period.

Quarter ended.	Number of Cases.
30th June, 1911,	—

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been attacked by SHEEP-SCAB and PARASITIC-MANGE in Ireland in the undermentioned period.

Quarter ended.	SHEEP-SCAB.		PARASITIC-MANGE.	
	Outbreaks Reported.	Sheep Attacked.	Outbreaks Reported.	Animals Attacked.
30th June, 1911	36	470	10	11

Veterinary Branch,
Department of Agriculture and Technical Instruction
for Ireland, Dublin.

BUTTER PRICES DURING THE QUARTER

ABSTRACTED FROM "THE GROCER," "GROCER'S REVIEW,"

Excepting 1-lb. Rolls and Farmers' Butter all Quotations are the
an Irish Creamery would be 5s. to 7s. per cwt. less than
freight, commission,

COUNTRY OF ORIGIN.	Type of Package.	Place of Sale.	WEEK ENDED			
			APRIL.			
			1st.	8th.	15th.	22nd.
IRELAND— Creamery Butter.	Kieis, kegs, or pyramid boxes	London, . . .	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.
		Liverpool, . .	108-112	108-110	108-110	108-110
		Bristol, . . .	—	112	—	108
		Cardiff, . . .	—	—	112	110-117
		Manchester, . .	111-114	111-115	109-114	107-111
		Birmingham, .	—	—	—	—
		Glasgow, . . .	—	104-107	—	—
		Limerick, . . .	—	—	—	—
		Cork,	—	—	—	—
		Belfast, . . .	—	—	—	—
	1 lb. rolls, in boxes, Salted or unsalted.	Dublin,	110-114	110-112	110-112	108-112
		P. O. R., . . .	121-4-126	116-8-126	116-8-126	112-126
Factories,		London,	—	—	—	94
		Liverpool, . .	95	95	96	96
		Bristol,	94-96	96-100	96-102	96-102
		Cardiff,	—	—	—	—
		Manchester, . .	—	—	—	—
Farmers' Butter,	Firkins 1st, Ex- port Price	Cork,	99-105	105	93-105	85-90
	Do. 2nd "	Cork,	83-88	86-89	83-89	86-84
	Do. 3rd "	Cork,	74-77	81-82	81	78
	Fresh,	Cork,	76-78	79-96	81-94	80-90
FRANCE,	12X2 lb. rolls, .	London,	Per doz. lbs. 12-15	Per doz. lbs. 12-15	Per doz. lbs. 12-15	Per doz. lbs. 12-15
			Per cwt.	Per cwt.	Per cwt.	Per cwt.
	Paris baskets, .	do.,	118-126	118-126	118-126	118-126
DENMARK AND SWEDEN.	Kieis,	Copenhagen	98	101	97	97
		Quotation, . .	Kr. 108 4	Kr. 113 2	Kr. 108 8	Kr. 108 8
			per 50	per 50	per 50	per 50
			per cwt.	per cwt.	per cwt.	per cwt.
		Average over- price,	Kilos —	Kilos —	Kilos —	Kilos —
		London,	117-119	117-120	116-119	114-118
		Liverpool, . .	120-124	117-122	118-124	116-120
		Bristol,	—	—	—	—
		Cardiff,	124-125	123-124	123-124	118-119
		Manchester, . .	117-122	117-121	116-120	113-118
		Birmingham, .	118-122	117-121	118-122	116-119
		Newcastle-on- Tyne,	119-121	116-120	115-119	113-116
		Glasgow, . . .	121-122	118-119	118-120	116-117
		Leith,	120-121	116 6-117 6	118-119	114
		Hull,	120-121	117-122	117-121	115-117
		F.O.R. London	—	—	—	—
	1 lb. rolls, 10X24 lbs. boxes, . .					
FINLAND,	Kieis,	Manchester, . .	116-119	116-119	116-118	112-115
		Liverpool, . .	—	—	—	—
		Hull,	—	—	—	112
		Cardiff,	121	120	120	115

ENDED 30TH JUNE, 1911.

"GROCER'S GAZETTE," AND OTHER TRADE REPORTS.

Landed Prices of the Choicest Qualities. The Nett F.O.R. Price to the landed Prices in Great Britain. This figure covers handling, &c.

WEEK ENDED									
MAY.					JUNE.				
29th.	6th.	13th.	20th.	27th.	3rd.	10th.	17th.	24th.	
Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	
106-107	104-108	102-107	102-105	100-104	100-104	102-104	104-108	106-110	
108-110	103-108	102-108	104-106	100-104	100-104	100-104	104-108	108-112	
110-112	108-110	108-110	108-108	104-108	104-108	104-108	104-108	114-118	
110-112	106-110	108-110	106-108	104-105	103-105	104-106	110-112	112-114	
108-112	101-106	100-106	104-106	100-104	98-104	103-108	103-108	109-114	
—	108-110	106-109	105-107	102-105	102-104	103-105	105-108	111-112	
—	—	—	104-106	104-108	—	103-105	105-106	109-110	
—	—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	—	
107-108	104-107	106-108	103-106	98-106	98-100	100-102/8	102/8-106	107/8 109/8	
112-126	112-121	110 10-121	107/4-121	106 6-116/8	106 6-116/8	107-116/8	110/10-116/8	112-121/4	
90-96	86	87-94	87-92	86-92	92-97	90-94	96-100	90-100	
96	96	90-94	90-94	88-94	85-90	90-94	90-94	90-95	
96-102	96-98	94-98	92-98	92-98	92-96	86-100	94-100	94-98	
—	98	96-98	93-96	95-98	90-98	95-98	95-102	95-100	
—	—	—	—	—	—	—	—	—	
90	90-93	87-92	86-88	84-87	83-84	84-86	87-88	88	
80-81	79-81	78-80	80-82	80-83	81-82	82 83	83-87	87	
73-78	74-75	75-77	76-77	75-76	76	77	77-78	78-82	
74-90	74-94	75-94	75-91	77-90	79-90	79-92	80-95	83-95	
Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	
12-15	11-14	11-14	10/6-13/6	10/6-13/6	10/6-13/6	10/6-13/6	11-14	11-14	
Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	
118-126	109-117	109-117	105-114	105-114	105-114	105-114	109-118	109-118	
93	93	93	90	90	90	92	96	96	
Kr. 104/1	Kr. 104/1	Kr. 104/1	Kr. 100/10	Kr. 100/10	Kr. 100/10	Kr. 103/1	Kr. 107/9	Kr. 107/9	
per 50	per 50	per 50	per 50	per 50	per 50	per 50	per 50	per 50	
Kilos	Kilos	Kilos	Kilos	Kilos	Kilos	Kilos	Kilos	Kilos	
111-113	111-113	110-112	106-108	107-109	107-109	110-112	115-116	115-117	
115-120	112-114	110-116	108-115	108-112	110-112	111-114	115-120	120-122	
119-119	116-116	114-115	112-113	113-114	114-115	112-114	114 6-115 6	121-123	
113-117	115 115	108-112	108-112	106-110	107-112	109-112	111-116	115-120	
115-119	110-114	110-114	110-114	108-111	109-111	110-112	112-115	117-120	
110-115	110-112	109-112	108-111	107-109	108-110	109-113	112-114	116-118	
119-117	111-112	111-112	110-111	108-109	109-110	110-111	113-114	118-119	
115/6-116	110	110-111	110	108	108	109 110	112-113	117-118	
114-115	111-113	108-113	108-110	106-107	107-109	106 109	110 112	114-116	
110-114	106-110	108-109	106-108	105-108	106-108	106-108	109-112	113-117	
110	107	107	105	—	105	105	107	111	
116	112	112	113	110	111	109-110	111	118	

(Continued on pages 760-1.

BUTTER PRICES DURING THE QUARTER

ABSTRACTED FROM "THE GROCER," "GROCER'S REVIEW,"

Excepting 1 lb. Rolls and Farmers' Butter all quotations are the
an Irish Creamery would be 5s. to 7s. per cwt. less than
freight, commission,

COUNTRY OF ORIGIN	Type of Package.	Place of Sale.	WEEK ENDED.			
			APRIL.			
			1st.	8th.	15th.	22nd.
RUSSIA AND SIBERIA.	Kieis,	London,	Per cwt. 100-102	Per cwt. 100-104	Per cwt. 100-104	Per cwt. 98-102
		Liverpool,	102-106	102-105	102-105	101-106
		Bristol,	100-104	100-104	100-104	100-104
		Cardiff,	—	—	—	—
		Manchester,	106-108	—	102-108	102-104
		Birmingham,	—	100-106	102-106	101-6-106
		Glasgow,	102-106	102-106	102-106	102-106
HOLLAND,	Boxes,	London,	—	—	—	—
		do.,	Per doz. lbs. 13 6-14	Per doz. lbs. 13 6-14	Per doz. lbs. 13 6-14	Per doz. lbs. 13 6-14
		Glasgow,—	Per cwt. —	Per cwt. —	Per cwt. —	Per cwt. —
		Fresh,	126-128	124-125	122-124	121-122
		Salt,	121-122	116-117	114-116	115-116
		Manchester,	—	—	—	—
		Hull,	120-124	118-124	117-120	117-119
ITALY,	Rolls,	London,	Per doz. lbs. —	Per doz. lbs. —	Per doz. lbs. —	Per doz. lbs. —
CANADA,	56 lb. boxes,	London,	Per cwt. —	Per cwt. —	Per cwt. —	Per cwt. —
AUSTRALIA AND NEW ZEALAND. *	Boxes,	Liverpool,	—	—	—	—
		Bristol,	—	—	—	—
		Cardiff,	—	—	—	—
		Birmingham,	—	—	—	—
		Glasgow,	—	—	—	—
		London,	A.s. 96-102	A.s. 96-104	A.s. 96-104	A.s. 96-104
		Liverpool,	u. 98-108	u. 100-108	u. 100-108	u. 100-108
		Bristol,	Z. 106-108	Z. 106-108	Z. 106-110	Z. 106-110
		Cardiff,	A. 102-106	A. 102-106	A. 100-106	A. 100-105
		Manchester,	Z. 105-113	Z. 109-113	Z. 110-113	Z. 110-114
		Birmingham,	A. 104-108	A. 104-108	A. 104-108	A. 104-107
		Glasgow,	Z. 112-114	Z. 112-114	Z. 112-114	Z. 112-116
		Leith,	A. 102-106	A. 100-108	A. 100-105	A. 100-106
		Hull,	Z. 111-114	Z. 110-112	Z. 110-112	Z. 110-117
ARGENTINA,	Boxes,	London,	A. 102-104	A. 101-105	A. 100-104	A. 100-104
		Liverpool,	Z. 108-110	Z. 109-111	Z. 109-112	Z. 109-112
		Bristol,	A. 100-106	A. 100-107	A. 98-105	A. 98-105
		Cardiff,	Z. 110-112	Z. 110-112	Z. 111-114	Z. 110-112
		Manchester,	A. 105-108	A. 104-106	A. 105-106	A. 106-107
		Birmingham,	Z. 110-112	Z. 110-112	Z. 112-114	Z. 112-114
		Glasgow,	A. —	A. —	A. —	A. —
		Leith,	Z. —	Z. —	Z. —	Z. —
		Hull,	A. 104-106	A. 104-106	A. 104-108	A. 104-107
		London,	Z. —	Z. —	Z. 108-110	Z. —
		Liverpool,	98-102	98-104	98-100	98-104
		Bristol,	104-106	104-106	—	103-106
		Cardiff,	—	—	—	—
		Manchester,	—	—	—	—
UNITED STATES	Tubs and boxes,	London,	—	—	—	—
		Liverpool,	—	—	—	—
		Bristol,	94-96	92-96	92-96	92-96
		Cardiff,	—	—	—	—
		Manchester,	—	—	—	—

* A.—Australia.

Z.—New Zealand.

s.—salted.

u.—unsalted.

ENDED 30th JUNE, 1911—continued.

"GROCER'S GAZETTE," AND OTHER TRADE REPORTS.

Landed Prices of the Choicest Qualities. The Nett F.O.R. Price to the landed prices in Great Britain. This figure covers handling, &c.

[illegible]

TABLES SHOWING THE EXPORTS

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT
the PORTS of EMBARKATION

IRISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ballina,	7	164	—	—	12	—	183	—	—	14	14
Belfast,	4,038	21,091	1,837	2,188	13	795	29,982	355	1	1,888	2,242
Coleraine,	22	549	1	2	3	—	570	—	—	—	—
Cork,	448	9,231	416	543	56	519	11,213	1,780	1,185	11,002	13,967
Drogheda,	756	11	48	—	—	—	815	1,913	—	12,952	14,865
Dublin,	8,547	21,397	6,480	763	26	2,677	39,890	11,300	34	63,777	75,111
Dundalk,	1,320	1,484	99	34	—	—	2,937	909	—	3,657	3,866
Dundrum,	—	72	—	1	—	—	73	—	—	—	—
Greenore,	445	347	333	319	—	—	1,444	623	41	2,935	3,599
Larne,	168	6,710	—	58	12	1	6,949	12	237	13	262
Limerick,	19	60	—	—	28	41	148	—	—	—	—
Londonderry,	4,042	10,668	208	678	16	4,027	19,639	219	2,647	2,651	5,517
Milford,	—	87	—	—	—	—	87	—	—	—	—
Mulroy,	2	72	—	—	—	—	74	6	—	—	6
Newry,	144	262	20	8	—	—	434	52	—	836	888
Portrush,	3	171	—	3	—	—	177	—	—	—	—
Rosslare,	—	—	—	—	—	—	—	—	—	—	—
Silgo,	61	1,029	—	—	28	—	1,118	130	—	429	559
Warrenpoint,	—	—	—	—	—	—	—	—	—	—	—
Waterford,	3,694	5,483	7	43	44	3	9,274	1,979	—	8,915	10,894
Westport,	17	1	—	4	2	—	24	903	—	503	1,406
Wexford,	473	751	2	—	—	—	1,226	2,124	—	2,043	4,167
TOTAL,	24,206	79,633	9,451	4,644	240	8,063	126,237	21,605	4,145	111,613	137,363

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT
the PORTS of DEBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ardrossan,	408	1,134	999	726	2	64	3,333	—	—	93	93
Ayr,	640	12,458	222	385	5	718	14,423	25	237	348	610
Barrow,	239	3,719	42	220	—	—	4,220	—	—	1	1
Bristol,	287	1,734	151	165	—	39	2,376	1,084	986	243	2,313
Campbeltown,	—	—	—	—	—	—	—	—	—	—	—
Dover,	—	—	—	—	—	—	—	—	—	—	—
Fishguard,	3,037	5,912	243	374	19	297	9,882	1,275	199	6,850	8,324
Fleetwood,	3,202	1,621	387	375	—	—	5,565	60	623	1,413	2,096
Glasgow,	1,431	16,262	432	597	120	6,529	25,371	161	9	1,961	2,131
Greenock,	3	2,751	—	25	1	—	2,780	6	—	14	20
Heysham,	358	10,004	1,064	571	3	133	12,133	91	1,486	2,720	4,297
Holyhead,	2,423	8,212	1,085	387	18	78	12,208	3,990	41	23,190	27,221
Liverpool,	9,210	8,785	4,779	754	59	208	23,795	13,539	590	67,872	81,941
London,	—	—	1	—	—	—	1	—	—	—	—
Manchester,	2,679	—	13	—	1	—	2,593	1,264	—	6,661	7,925
Oban,	—	3	4	—	—	1	8	—	—	—	—
Newhaven,	—	22	—	—	—	—	22	—	—	—	—
Plymouth,	41	20	—	1	—	—	62	—	—	—	—
Preston,	161	—	44	—	—	—	205	110	34	247	391
Silloth,	20	1,030	—	—	—	—	1,056	—	—	—	—
Southampton,	—	112	—	5	—	—	117	—	—	—	—
Stranraer,	167	5,782	—	58	12	1	6,020	—	—	—	—
Whitehaven,	—	72	—	1	—	—	73	—	—	—	—
TOTAL,	24,206	79,633	9,451	4,644	240	8,063	126,237	21,605	4,145	111,613	137,363

AND IMPORTS OF ANIMALS.

I.

BRITAIN during the Three Months ended 30th JUNE, 1911, showing in Ireland.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	IRISH PORTS.
Fat.	Stores.	Total.		Stallions.	Mares.	Geldings.	Total.				
745	—	745	—	—	—	1	1	—	—	943	Ballina.
817	3,759	4,576	82	1	1,171	2,232	3,404	3	9	40,278	Belfast.
25	—	25	—	—	2	4	6	—	—	601	Coleraine.
2,602	—	2,602	16	1	119	165	285	1	305	28,379	Cork.
687	421	1,088	11	—	13	13	26	—	—	16,805	Drogheda.
23,003	126	23,729	28	28	1,377	1,208	2,613	2	297	141,670	Dublin.
1,427	2,343	3,770	915	—	237	102	399	—	207	12,094	Dundalk.
—	—	—	—	—	—	—	—	—	—	73	Dundrum.
253	636	889	229	—	1,518	960	2,478	—	—	8,639	Greenore.
24	2,019	2,043	3	3	74	206	283	—	1	9,541	Larne.
—	—	—	—	—	—	3	3	—	1	152	Limerick.
345	7	352	2	—	51	79	130	—	2	25,642	Londonderry.
142	—	142	—	—	2	1	3	—	3	235	Milford.
113	—	113	—	—	—	—	—	—	—	193	Mulroy.
140	—	140	1	—	—	—	—	—	2	1,465	Newry.
12	—	12	—	—	2	1	3	—	—	192	Portrush.
—	—	—	2	—	5	13	18	—	—	20	Rosslare.
4,008	238	4,246	—	—	1	2	3	—	—	5,926	Sligo.
—	—	—	—	—	—	—	—	—	—	—	Warrenpoint.
4,782	1	4,783	—	6	551	638	1,195	—	306	26,452	Waterford.
1,003	—	1,003	—	—	4	3	7	—	—	2,440	Westport.
1,122	—	1,122	—	—	2	1	3	—	3	6,521	Wexford.
41,830	9,550	51,380	1,279	39	5,129	5,692	10,860	6	1,136	328,201	TOTAL.

II.

BRITAIN during the Three Months ended 30th JUNE, 1911, showing in Great Britain.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	BRITISH PORTS.
Fat.	Stores.	Total.		Stallions.	Mares.	Geldings.	Total.				
19	1,562	1,581	80	—	125	353	478	—	—	5,565	Ardrossan.
37	2,978	3,015	—	1	20	48	69	—	—	18,117	Ayr.
387	9	396	—	—	95	187	282	—	—	4,899	Barrow.
1,542	—	1,542	1	1	26	68	95	—	266	6,593	Bristol.
—	—	—	—	—	1	—	1	—	—	1	Campbeltown.
—	—	—	—	—	1	3	4	—	—	4	Dover.
2,901	1	2,902	2	5	609	679	1,293	1	240	22,644	Fishguard.
143	99	242	—	—	822	850	1,372	—	4	9,279	Fleetwood.
4,246	66	4,312	—	1	250	416	667	—	7	32,488	Glasgow.
11	1	12	2	—	13	14	27	—	—	2,841	Greenock.
2,141	6	2,147	4	—	275	488	763	3	5	19,352	Heysham.
15,005	674	15,679	242	27	2,482	1,718	4,227	—	40	59,612	Holyhead.
16,187	2,624	17,811	944	—	546	572	1,118	2	571	136,132	Liverpool.
—	—	—	—	—	5	8	13	—	—	14	London.
131	—	131	1	—	55	40	95	—	2	10,747	Manchester.
—	4	4	—	—	4	2	6	—	—	18	Oban.
—	—	—	—	—	5	4	9	—	—	31	Newhaven.
—	—	—	—	1	4	16	21	—	—	83	Plymouth.
80	—	80	—	—	3	8	11	—	—	687	Preston.
—	—	—	—	—	11	6	17	—	—	1,072	Silloth.
—	—	—	—	—	4	6	10	—	—	127	Southampton.
—	1,526	1,526	3	3	73	206	282	—	1	7,832	Stranraer.
—	—	—	—	—	—	—	—	—	—	73	Whitehaven.
41,830	9,550	51,380	1,279	39	5,129	5,692	10,860	6	1,136	328,261	TOTAL.

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT BRITAIN
the PORTS

IRISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total	Fat.	Stores.	Lambs.	Total
Ballina,	—	—	1	—	—	—	1	—	—	—	—
Belfast,	—	—	—	—	20	—	20	1,072	58	1	1,131
Coleraine,	—	—	—	—	—	—	—	—	—	—	—
Cork,	—	13	—	1	2	—	16	—	—	—	—
Drogheda,	—	—	—	—	—	—	—	—	—	—	—
Dublin,	—	21	6	—	—	4	31	—	70	—	7
Dundalk,	—	—	2	—	—	—	2	—	—	—	—
Dundrum,	—	—	—	—	—	—	—	—	—	—	—
Greenore,	—	1	3	—	1	—	5	11	—	—	1
Larne,	—	2	—	—	12	—	14	134	260	—	39
Limerick,	—	—	—	—	—	—	—	—	—	—	—
Londonderry,	—	—	1	—	—	1	2	—	—	2	—
Milford,	—	—	—	—	—	—	—	—	—	—	—
Mulroy,	—	—	—	—	—	—	—	—	—	—	—
Newry,	—	—	—	—	—	—	—	—	—	—	—
Portrush,	—	—	—	—	—	—	—	69	—	—	6
Rosslare,	—	—	2	—	1	2	5	—	—	—	—
Silgo,	—	—	—	—	—	—	—	39	—	—	3
Warrenpoint,	—	—	—	—	—	—	—	—	—	—	—
Waterford,	—	1	—	—	—	—	1	—	35	—	3
Westport,	—	—	—	—	—	—	—	—	—	—	—
Wexford,	—	—	—	—	—	—	—	—	—	—	—
TOTAL,	—	38	15	1	36	7	97	1,325	423	3	1,751

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT BRITAIN
the PORTS of EMBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total	Fat.	Stores.	Lambs.	Total
Ardrossan,	—	—	—	—	1	—	1	511	—	—	511
Ayr,	—	—	—	—	9	—	9	695	313	—	1,008
Barrow,	—	—	—	—	—	—	—	—	—	—	—
Bristol,	—	—	—	—	2	—	2	—	—	—	—
Cardiff,	—	—	—	—	—	—	—	—	—	—	—
Dover,	—	—	—	—	—	—	—	—	—	—	—
Fishguard,	—	11	2	—	1	2	16	—	35	—	—
Fleetwood,	—	—	—	—	—	—	—	—	—	—	—
Glasgow,	—	13	4	1	5	4	27	39	73	1	113
Greenock,	—	—	—	—	—	—	—	69	—	—	—
Heysham,	—	—	—	—	4	—	4	—	—	2	—
Holyhead,	—	11	7	—	1	1	20	11	2	—	—
Liverpool,	—	—	2	—	1	—	3	—	—	—	—
London,	—	—	—	—	—	—	—	—	—	—	—
Manchester,	—	—	—	—	—	—	—	—	—	—	—
Newhaven,	—	—	—	—	—	—	—	—	—	—	—
Plymouth,	—	—	—	—	—	—	—	—	—	—	—
Preston,	—	—	—	—	—	—	—	—	—	—	—
Silloth,	—	—	—	—	—	—	—	—	—	—	—
Southampton,	—	1	—	—	—	—	1	—	—	—	—
Stranraer,	—	2	—	—	12	—	14	—	—	—	—
Whitehaven,	—	—	—	—	—	—	—	—	—	—	—
TOTAL,	—	38	15	1	36	7	97	1,325	423	3	1,751

III.

BRITAIN during the Three Months ended 30th JUNE, 1911, showing
DEBARKATION IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
—	—	—	3	16	59	85	160	—	—	1	Ballina.
—	—	—	—	—	—	—	—	—	—	1,314	Belfast.
—	—	—	—	2	65	71	138	—	1	155	Coleraine.
—	—	—	—	—	1	—	1	—	—	1	Cork.
—	—	—	5	53	315	216	584	—	—	690	Drogheda.
—	—	—	—	—	5	1	6	—	—	8	Dublin.
—	—	—	—	—	—	—	—	—	—	—	Dundalk.
—	—	—	—	1	77	45	123	—	—	139	Dundrum.
—	—	—	1	7	9	7	23	—	—	432	Greenore.
—	—	—	—	—	—	—	—	—	—	—	Larne.
—	—	—	—	2	9	9	20	—	—	—	Limerick.
—	—	—	—	—	—	—	—	—	—	24	Londonderry
—	—	—	—	—	—	—	—	—	—	—	Millford.
—	—	—	—	—	—	—	—	—	—	—	Mulroy.
—	—	—	—	—	1	—	1	—	—	1	Newry.
—	—	—	—	—	2	—	2	—	—	71	Portrush.
—	—	—	—	—	10	14	24	—	2	31	Rosslare.
—	—	—	—	—	—	—	—	—	—	39	Sligo.
—	—	—	—	—	—	—	—	—	—	—	Warrenpoint.
—	—	—	—	27	77	66	170	—	1	207	Waterford.
—	—	—	—	—	1	1	2	—	—	2	Westport.
—	—	—	—	—	1	—	1	—	—	1	Wexford.
—	—	—	9	108	632	515	1,255	—	4	3,116	TOTAL.

IV.

BRITAIN during the Three Months ended 30th JUNE, 1911, showing
in Great Britain.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	BRITISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
—	—	—	—	—	1	5	6	—	—	518	Ardrossan.
—	—	—	—	11	7	24	42	—	—	1,059	Ayr.
—	—	—	—	—	—	—	—	—	—	—	Barrow.
—	—	—	—	18	58	39	115	—	—	117	Bristol.
—	—	—	—	—	—	—	—	—	—	—	Cardiff.
—	—	—	—	—	—	—	—	—	—	—	Dover.
—	—	—	—	9	83	90	182	—	2	233	Fishguard.
—	—	—	—	4	30	38	72	—	—	72	Fleetwood.
—	—	—	—	8	18	20	46	—	—	186	Glasgow.
—	—	—	—	—	8	7	15	—	—	84	Greenock.
—	—	—	2	—	11	11	22	—	—	30	Heysham.
—	—	—	1	47	377	237	661	—	—	695	Holyhead.
—	—	—	5	2	21	17	40	—	1	49	Liverpool.
—	—	—	—	—	1	1	2	—	—	2	London.
—	—	—	—	1	1	—	2	—	—	2	Manchester.
—	—	—	—	—	—	—	—	—	—	—	Newhaven.
—	—	—	—	1	7	18	26	—	1	27	Plymouth.
—	—	—	—	—	—	—	—	—	—	—	Preston.
—	—	—	—	—	—	—	—	—	—	—	Silloth.
—	—	—	—	—	2	1	3	—	—	—	Southampton.
—	—	—	1	7	7	7	21	—	—	36	Stranraer.
—	—	—	—	—	—	—	—	—	—	—	Whitehaven.
—	—	—	9	108	632	515	1,255	—	4	3,116	TOTAL.

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT
the PORTS OF

IRISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ballina,	—	—	1	—	—	—	1	—	—	—	—
Belfast,	—	—	—	—	20	—	20	1 072	58	1	1,131
Coleraine	—	—	—	—	—	—	—	—	—	—	—
Cork,	—	13	—	1	2	—	16	—	—	—	—
Drogheda,	—	—	—	—	—	—	—	—	—	—	—
Dublin,	—	21	6	—	—	4	31	—	70	—	70
Dundalk,	—	—	2	—	—	—	2	—	—	—	—
Dundrum,	—	—	—	—	—	—	—	—	—	—	—
Greenore,	—	1	3	—	1	—	5	11	—	—	11
Larne,	—	2	—	—	12	—	14	134	260	—	394
Limerick,	—	—	—	—	—	—	—	—	—	—	—
Londonerry,	—	—	1	—	—	1	2	—	—	2	2
Milford,	—	—	—	—	—	—	—	—	—	—	—
Mulroy,	—	—	—	—	—	—	—	—	—	—	—
Newry,	—	—	—	—	—	—	—	—	—	—	—
Portrush,	—	—	—	—	—	—	—	69	—	—	69
Rosslare,	—	—	2	—	1	2	5	—	—	—	—
Sligo,	—	—	—	—	—	—	—	39	—	—	39
Warrenpoint,	—	—	—	—	—	—	—	—	—	—	—
Waterford	—	1	—	—	—	—	1	—	35	—	35
Westport	—	—	—	—	—	—	—	—	—	—	—
Wexford	—	—	—	—	—	—	—	—	—	—	—
TOTAL,	—	38	15	1	36	7	97	1,325	423	3	1,751

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT
the PORTS OF EMBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ardrossan,	—	—	—	—	1	—	1	511	—	—	511
Ayr,	—	—	—	—	9	—	9	695	313	—	1,008
Barrow,	—	—	—	—	—	—	—	—	—	—	—
Bristol,	—	—	—	—	2	—	2	—	—	—	—
Cardiff,	—	—	—	—	—	—	—	—	—	—	—
Dover	—	—	—	—	—	—	—	—	—	—	—
Fishguard,	—	11	2	—	1	2	16	—	35	—	35
Fleetwood,	—	—	—	—	—	—	—	—	—	—	—
Glasgow,	—	13	4	1	5	4	27	39	73	1	113
Greenock,	—	—	—	—	—	—	—	69	—	—	69
Heysham,	—	—	—	—	4	—	4	—	—	2	2
Holyhead,	—	11	7	—	1	1	20	11	2	—	13
Liverpool,	—	—	2	—	1	—	3	—	—	—	—
London,	—	—	—	—	—	—	—	—	—	—	—
Manchester,	—	—	—	—	—	—	—	—	—	—	—
Newhaven,	—	—	—	—	—	—	—	—	—	—	—
Plymouth,	—	—	—	—	—	—	—	—	—	—	—
Preston,	—	—	—	—	—	—	—	—	—	—	—
Silloth,	—	—	—	—	—	—	—	—	—	—	—
Southampton,	—	1	—	—	—	—	1	—	—	—	—
Stranraer	—	2	—	—	12	—	14	—	—	—	—
Whitehaven,	—	—	—	—	—	—	—	—	—	—	—
TOTAL,	—	38	15	1	36	7	97	1,325	423	3	1,751

III.

BRITAIN during the Three Months ended 30th JUNE, 1911, showing
DEBARKATION IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
—	—	—	—	—	—	—	—	—	—	1	Ballina.
—	—	—	3	16	59	85	160	—	—	1,314	Belfast.
—	—	—	—	—	—	—	—	—	—	—	Coleraine.
—	—	—	—	2	65	71	138	—	1	155	Cork.
—	—	—	—	—	1	—	1	—	—	1	Drogheda.
—	—	—	5	53	315	216	584	—	—	690	Dublin.
—	—	—	—	—	5	1	6	—	—	8	Dundalk.
—	—	—	—	—	—	—	—	—	—	—	Dundrum.
—	—	—	—	1	77	45	123	—	—	139	Greenore.
—	—	—	1	7	9	7	23	—	—	432	Larne.
—	—	—	—	2	—	—	—	—	—	—	Limerick.
—	—	—	—	—	9	9	20	—	—	24	Londonderry.
—	—	—	—	—	—	—	—	—	—	—	Malford.
—	—	—	—	—	—	—	—	—	—	—	Mulrov.
—	—	—	—	—	1	—	1	—	—	1	Newry.
—	—	—	—	—	2	—	2	—	—	71	Portrush.
—	—	—	—	—	10	14	24	—	2	31	Rosslare.
—	—	—	—	—	—	—	—	—	—	39	Shro.
—	—	—	—	—	—	—	—	—	—	—	Warrenpoint.
—	—	—	—	27	77	66	170	—	1	207	Waterford.
—	—	—	—	—	1	1	2	—	—	2	Westport.
—	—	—	—	—	1	—	1	—	—	1	Wexford.
—	—	—	9	108	632	515	1,255	—	4	3,116	TOTAL.

IV.

BRITAIN during the Three Months ended 30th JUNE, 1911, showing
in Great Britain.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	BRITISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
—	—	—	—	—	1	5	6	—	—	518	Ardrossan.
—	—	—	—	11	7	24	42	—	—	1,059	Ayr.
—	—	—	—	—	—	—	—	—	—	—	Barrow.
—	—	—	—	18	58	39	115	—	—	117	Bristol.
—	—	—	—	—	—	—	—	—	—	—	Cardiff.
—	—	—	—	—	—	—	—	—	—	—	Dover.
—	—	—	—	9	83	90	182	—	2	235	Fishguard.
—	—	—	—	4	30	38	72	—	—	72	Fleetwood.
—	—	—	—	8	18	20	46	—	—	186	Glasgow.
—	—	—	—	—	8	7	15	—	—	84	Greenock.
—	—	—	2	—	11	11	22	—	—	30	Heysham.
—	—	—	1	47	377	237	661	—	—	695	Holyhead.
—	—	—	5	2	21	17	40	—	1	49	Liverpool.
—	—	—	—	—	1	1	2	—	—	2	London.
—	—	—	—	1	1	—	—	—	—	2	Manchester.
—	—	—	—	—	—	—	—	—	—	—	Newhaven.
—	—	—	—	1	7	18	26	—	1	27	Plymouth.
—	—	—	—	—	—	—	—	—	—	—	Preston.
—	—	—	—	—	—	—	—	—	—	—	Silloth.
—	—	—	—	—	2	1	3	—	—	4	Southampton.
—	—	—	—	1	7	7	21	—	—	36	Stranraer.
—	—	—	—	—	—	—	—	—	—	—	Whitehaven.
—	—	—	9	108	632	515	1,255	—	4	3,116	TOTAL.

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, .	—	39	25	—	64	31	39	70
DUBLIN, .	—	—	—	—	—	—	—	—
TOTAL, .	—	39	25	—	64	31	39	70

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the
showing the PORTS of DEBARKATION

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, .	—	39	25	—	64	31	39	70

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, .	—	—	—	—	—	—	—	—
DUBLIN, .	—	—	—	—	—	—	—	—
TOTAL, .	—	—	—	—	—	—	—	—

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the
showing the PORTS of EMBARKATION

ISLE OF MAN PORT.	CATTLE					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, .	—	—	—	—	—	—	—	—

ISLE OF MAN during the Three Months ended 30th June, 1911.
EMBARKATION IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stallions	Mares.	Geldings	Total.				
—	—	—	—	—	27	32	59	—	—	193	BELFAST. DUBLIN.
—	—	—	—	—	31	16	47	—	—	47	
—	—	—	—	—	58	48	106	—	—	240	TOTAL.

ISLE OF MAN during the Three Months ended 30th June, 1911,
in the ISLE OF MAN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stallions	Mares.	Geldings	Total.				
—	—	—	—	—	58	48	106	—	—	240	DOUGLAS.

ISLE OF MAN during the Three Months ended 30th June, 1911,
DEBARKATION IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stallions	Mares.	Geldings	Total.				
—	—	—	—	—	2	—	2	—	—	2	BELFAST. DUBLIN.
—	—	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	2	—	2	—	—	2	TOTAL.

ISLE OF MAN during the Three Months ended 30th June, 1911,
in the ISLE OF MAN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stallions	Mares.	Geldings	Total.				
—	—	—	—	—	2	—	2	—	—	2	DOUGLAS.

COASTING AND

RETURN OF THE NUMBER OF ANIMALS SHIPPED to and from Places in
the Places of Embarkation

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Cork to Aghada Pier, .	—	—	—	—	—	—	—	—	—	—	—
" to Belfast, .	—	—	—	—	—	—	—	—	—	—	—
" to Spike Island, .	—	—	—	—	—	—	—	—	—	—	—
" to Queenstown, .	—	—	—	—	—	—	—	—	—	—	—
" to Waterford, .	—	3	—	8	11	—	—	—	—	—	—
Total, .	—	3	—	8	11	—	—	—	—	—	—
Aghada Pier to Cork, .	—	—	—	—	—	—	—	—	—	—	—
Belfast " .	—	10	1	—	11	—	—	—	—	—	—
Spike Island " .	—	—	—	—	—	—	—	—	—	—	—
Queenstown " .	—	—	—	—	—	—	—	—	—	—	—
Waterford " .	5	—	10	—	15	—	—	—	—	—	—
Total, .	5	10	11	—	26	—	—	—	—	—	—
Waterford to Ballyhack, .	—	—	—	23	23	—	—	—	—	—	—
" to Belfast, .	—	—	—	—	—	—	—	—	—	—	—
" to Duncannon .	—	47	1	97	145	4	5	9	—	—	—
Total, .	—	47	1	120	168	4	5	9	—	—	—
Ballyhack to Waterford, .	21	22	—	—	43	119	274	393	2	—	2
Dublin to Belfast, .	136	—	7	1	144	450	157	607	—	—	—
Duncannon to Waterford, .	122	35	—	—	157	57	42	99	181	—	181
Kilrush to Limerick, .	—	204	—	—	204	—	—	—	1,068	—	1,068
Kildysart " .	—	—	—	—	—	—	—	—	—	—	—
Glin, " .	—	—	—	—	—	—	—	—	—	—	—
Portlanna, " .	—	—	—	—	—	—	—	—	460	—	460
Tarbert, " .	—	—	13	—	13	—	—	—	44	—	44
Kilkee, " .	—	—	—	—	—	—	—	—	136	—	136
Total, .	—	204	13	—	217	—	—	—	1,708	—	1,708
Greencastle to Greenore, .	—	—	—	—	—	—	—	—	—	—	—
Belfast to Dublin, .	—	—	—	20	20	—	—	—	—	—	—
Londonderry to Moville, .	3	8	1	—	12	10	18	28	—	—	—
Moville to Londonderry, .	13	144	8	2	167	11	12	23	—	—	—
Ballina to Sligo, .	—	—	—	—	—	20	—	20	—	—	—
Belmullet " .	1	—	—	—	1	—	—	—	40	—	40
Total, .	1	—	—	—	1	20	—	20	40	—	40
Sligo to Belmullet, .	—	—	—	—	—	—	—	—	—	1	1
Milford to Portrush, .	—	—	—	—	—	—	—	—	—	2	2
Milford to Mulroy, .	—	—	—	—	—	120	—	120	1	—	1
Portrush to Londonderry, .	—	12	—	—	12	—	—	—	—	—	—
Londonderry to Mulroy, .	—	—	—	—	—	—	—	—	—	—	—
Total, .	301	485	41	151	978	791	508	1,299	1,932	3	1,935

INLAND NAVIGATION.

Ireland during the Three Months ended 30th JUNE, 1911, showing and Debarkation.

Goats.	Horses.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
—	—	—	—	—	—	—	—	Cork to Aghada Pier.
—	—	—	—	—	—	—	—	„ to Belfast.
—	—	—	—	—	—	—	—	„ to Spike Island.
—	—	1	1	2	—	—	13	„ to Queenstown.
—	—	—	—	—	—	—	—	„ to Waterford.
—	—	1	1	2	—	—	13	Total.
—	—	—	—	—	—	—	—	Aghada Pier to Cork.
—	—	—	—	—	—	—	11	Belfast „
—	—	—	—	—	—	—	—	Spike Island „
—	—	—	—	—	—	—	15	Queenstown „
—	—	—	—	—	—	—	—	Waterford „
—	—	—	—	—	—	—	26	Total.
—	—	1	—	1	—	—	24	Waterford to Ballyhack
—	—	3	1	4	—	6	164	„ to Belfast.
—	—	4	1	5	—	6	188	„ to Duncannon.
—	—	1	—	1	—	—	439	Total.
—	—	—	1	1	—	—	752	Ballyhack to Waterford.
—	—	1	1	2	—	—	439	Dublin to Belfast.
—	—	1	1	2	—	—	439	Duncannon to Waterford.
—	—	40	42	82	—	—	1,354	Kilrush to Limerick.
—	—	—	—	—	—	—	—	Kildysart „
—	—	—	—	—	—	—	—	Glin „
—	—	—	—	—	—	—	160	Portumna „
—	—	—	—	—	—	—	57	Tarbert „
—	—	—	—	—	—	—	136	Kilkee „
—	—	40	42	82	—	—	2,007	Total.
—	—	—	—	—	—	—	—	Greencastle to Greonore.
—	—	1	2	3	—	—	23	Belfast to Dublin.
—	—	—	—	—	—	—	40	Londonderry to Moville.
—	—	—	—	—	—	—	190	Moville to Londonderry.
—	—	—	—	—	—	—	20	Ballina to Shgo.
—	—	—	—	—	—	—	41	Behmullet „
—	—	—	—	—	—	—	61	Total.
—	—	—	—	—	—	—	1	Shgo to Behmullet.
—	—	—	—	—	—	—	2	Milford to Portrush.
—	—	—	—	—	—	—	121	Milford to Mulroy.
—	—	—	—	—	—	—	12	Portrush to Londonderry.
—	—	—	—	—	—	—	—	Londonderry to Mulroy.
—	—	48	48	96	—	6	4,314	Total.

RETURN of the NUMBER of HORSES EXPORTED from IRELAND through GREAT BRITAIN to the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 30th June, 1911, showing the Ports of Embarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast,	—	230	244	474
Cork,	—	—	1	1
Dublin,	—	104	76	180
Dundalk,	—	135	49	184
Greenore,	—	742	364	1,106
Waterford,	4	273	269	546
Total,	4	1,484	1,003	2,491

RETURN of the NUMBER of HORSES IMPORTED into IRELAND through GREAT BRITAIN from the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 30th JUNE, 1911, showing the Ports of Debarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast,	11	2	18	31
Dublin,	—	—	—	—
Waterford,	—	—	—	—
Total,	11	2	18	31

RETURN of the NUMBER of HORSES IMPORTED into IRELAND direct from FOREIGN COUNTRIES during the THREE MONTHS ended 30th JUNE, 1911, showing the Ports of Debarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Dublin,	—	—	—	—
Portrush,	—	—	—	—
Total,	—	—	—	—

EMIGRATION FROM IRELAND.

TABLE showing, by Destinations, the Numbers of Emigrants (Natives of Ireland) who left the Ports of Ireland during the months of April, May, and June, 1911, and the total for the Six Months ended the 30th June, 1911, together with the total Number of Emigrants in each of the corresponding periods of the year 1910.

DESTINATION.	April, 1911.	May, 1911.	June, 1911.	Six Months ended 30th June, 1911.
FOREIGN COUNTRIES AND THE COLONIES :—				
America (U.S.),	6,135	3,780	1,371	13,746
Canada,	987	1,024	564	3,509
South Africa,	10	11	6	49
Australia,	63	97	66	375
New Zealand,	7	18	13	77
Other Countries,	2	3	9	17
Total,	7,204	4,933	2,029	17,773
GREAT BRITAIN :—				
England and Wales,	120	167	132	795
Scotland,	22	22	21	191
Total,	142	189	153	986
General Total for 1911,	7,346	5,122	2,182	18,759
General Total for 1910,	6,888	5,459	2,739	18,955

The figures in the above Table have been abstracted from the monthly Returns published by the Registrar-General for Ireland.

The figures are subject to revision in the Annual Report.

ACCOUNT showing the QUANTITIES of certain kinds of AGRICULTURAL
into Ireland in each WEEK from

ARTICLES.	WEEK ENDED.				
	1st April.	8th April.	15th April.	22nd April.	29th April.
ANIMALS LIVING—					
Horses, No.	—	—	—	—	—
FRESH MEAT—					
Beef (including refrigerated and frozen), cwt.	—	—	—	—	—
Mutton, "	—	—	—	—	—
Pork, "	—	—	—	—	—
Unenumerated, "	—	—	—	—	—
SALTED OR PRESERVED MEAT—					
Bacon, cwt.	—	—	—	—	—
Beef, "	—	—	—	—	—
Ham, "	—	—	—	—	—
Pork, "	—	—	—	—	—
Meat, unenumerated, Salted "	—	—	—	—	—
Meat, preserved otherwise than by salting (including tinned and canned), cwt.	—	—	—	1	145
DAIRY PRODUCE AND SUBSTITUTES—					
Butter, cwt.	—	—	—	—	—
Margarine, "	99	74	63	54	84
Cheese, "	—	2	—	—	2
Milk, Condensed, "	35	34	27	49	40
" Cream, "	—	—	—	—	—
" Preserved, other kinds "	—	—	—	—	—
Eggs, gt. hunds.	120	—	144	—	144
LARD, cwt.	—	—	518	—	9
CORN, GRAIN, MEAL AND FLOUR—					
Wheat, cwt.	49,300	108,500	198,400	74,500	222,500
Wheat, Meal and Flour, . . "	11,400	4,500	33,400	26,800	14,900
Barley, "	—	—	—	—	—
Oats, "	—	13,000	37,000	—	—
Peas, "	—	—	—	40	—
Beans, "	—	—	—	—	—
Maize or Indian Corn, . . "	166,300	—	212,500	—	261,800
FRUIT, RAW—					
Apples, "	—	—	—	—	—
Currants, "	—	—	—	—	—
Gooseberries, "	—	—	—	—	—
Pears, "	—	—	—	—	—
Plums, "	—	—	—	—	—
Grapes, "	—	—	—	—	—
Lemons, "	—	—	—	—	—
Oranges, "	—	—	—	—	—
Strawberries, "	—	—	—	—	—
Unenumerated, "	—	—	—	—	—
HAY, tons,	—	—	—	—	—
STRAW, "	—	—	—	—	—
Moss LITTER, "	89	60	56	35	35
Hops, cwt.	—	—	—	—	—
VEGETABLES, RAW—					
Onions, bushels,	—	—	—	—	—
Potatoes, cwt.	—	—	—	—	—
Tomatoes, "	—	—	—	—	—
Unenumerated, £	—	12	—	—	—
VEGETABLES, DRIED, . . cwt.	—	—	—	—	—
Preserved by Canning, . . "	—	1	—	—	—
POULTRY AND GAME, . . £	—	—	—	—	—

* This Table is confined to the Imports of certain kinds of Agricultural Produce into
a request from this Department kindly consented to separate the Irish Imports (direct
form of Weekly Returns.

PRODUCE Imported direct (i.e., from the Colonies or Foreign Countries)
1st April to 24th June, 1911.*

WEEK ENDED							
6th May.	13th May.	20th May.	27th May.	3rd June.	10th June.	17th June.	24th June.
—	—	—	—	—	—	—	—
4,080	—	—	—	—	—	—	—
2,000	—	115	—	—	—	—	—
63	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	25	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
101	115	50	62	73	67	66	76
—	1	1	—	78	—	188	—
63	38	82	91	70	36	9	47
—	—	—	—	—	—	—	—
—	144	600	180	—	—	—	120
1,534	—	29	322	184	—	—	87
157,900	109,700	48,900	138,300	41,600	76,000	269,800	175,100
30,600	1,709	—	32,900	24,500	35,300	22,400	10,590
98,400	—	—	—	—	—	5,600	2,700
—	20	—	—	—	—	—	20
139,100	—	120,900	333,700	529,100	—	108,500	469,500
—	—	—	—	—	—	—	—
—	—	—	—	—	—	16	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	10	—	—	—	17	—
—	—	—	—	—	—	—	—
60	51	41	30	45	40	36	30
—	12	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	1,670	—	—	—	—	—	—
—	—	—	—	—	—	—	—

Ireland from the Colonies and Foreign Countries. The Board of Customs have in answer from those of the United Kingdom, and to supply this Department with them in the

Statistics and Intelligence Branch,
Department of Agriculture
and Technical Instruction for Ireland.

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